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## Original Articles

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### EXPERIMENTAL STUDIES OF THE OPTIC THALAMUS AND THE CORPUS STRIATUM

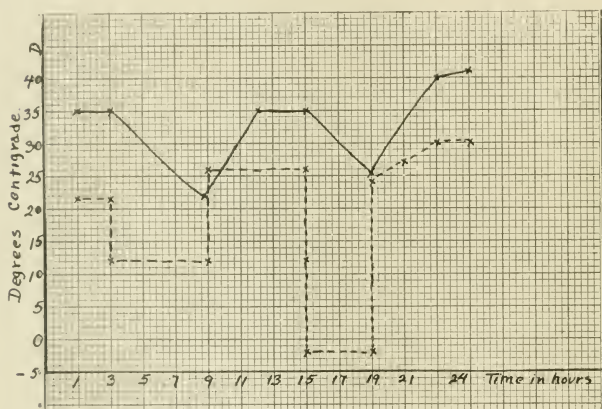
BY F. T. ROGERS

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Three years ago Dr. A. J. Carlson, in line with his studies on the control of hunger, suggested a detailed study of the conditions of the gastro-intestinal canal in decerebrate animals. The experiments here reported are a continuation of that work. By that work attention was again called to the striking differences in behavior of warm-blooded animals from which the cerebrum has been removed, with or without at the same time doing damage to the thalamus.

The original experiments of Rolando and Flourens on the removal of the cerebrum in pigeons led to the gradual recognition that the classic picture of a decerebrate animal was obtained, only if the thalamus remained intact. Such a bird, for the most part, stands quietly at rest with feathers fluffed in a sleeping attitude. But when the crop is empty, this bird begins to "wake up"; it preens itself, stretches and walks about. It gives responses to light stimulation, and to sudden noises. Giving feed and water restores it to its sleepy inactive condition. In this bird the body temperature remains normal; equilibration is perfect; the gastro-intestinal machinery works in a normal manner; the feathers, when the bird is quiet, are fluffed and reflex changes in the position of the feathers may be induced in many ways. In contrast with this picture, if the thalamus be also injured, the bird stands quietly but the feathers lie flat against the body; the body temperature falls and the bird makes no spontaneous

movements or gives no visible response to starvation. Usually such birds live only a short time, a few days or weeks, in marked contrast to decerebrate birds with thalamus intact in which, the bird, with proper care may live for months.<sup>1</sup> Various attempts have been made to explain these differences, the usual statements implying that the reflex pathways involve this part of the brain, or are in some way dependent on it. The loss of the thalamus produces effects which in some ways resemble those attributed to "shock." Bechterew considered that the thalamic part of the brain must bear some direct relation to the normal functioning of the visceral organs.



Body Temperature Curve of Pigeon with Cerebrum Removed and Lesion in Thalamus. Continuous Line = Temperature of Bird. Dotted Line = Temperature of Cage.

Various things suggested a study of the body temperature in these birds with rather surprising results. The facts are indicated by the accompanying graph. It was found that the decerebrate bird with thalamus intact maintained normal body temperature through extreme ranges of temperature of its cage of from  $-4$  to  $36$  degrees C. But in the bird in which the thalamus is removed, the temperature fluctuates with that of its cage. It does not become identical with that of the environment but averages 8 to 10 degrees above it. Then it was found that if the temperature of the cage was so controlled as to force the temperature of the bird up to within 2

<sup>1</sup> The literature has been reviewed by the writer in *Amer. Jour. Physiology*, XLI, 1916, p. 557.

or 3 degrees of the normal ( $41^{\circ}$  C.) that under these conditions this bird with extirpated thalamus also made spontaneous movements; that it walks about just as does the decerebrate bird with intact thalamus. This observation seems conclusive proof that somatic responses to various stimuli does not necessarily involve thalamic pathways. A bird of this kind will give to external stimulation by irritation of the foot, nostrils (irritating vapors), of the cloaca, or of the vestibular organs (by rotation) reactions similar to those of the decerebrate bird with intact thalamus. But if the body temperature is allowed to fall four or five degrees then these responses gradually fail. With the average room temperature of about 20 to 25 degrees C. the temperature of the bird is about 30 to 35 degrees and hence the lack of spontaneous movements in such birds.

Two other facts have also been of special interest. In these birds with thalamic destruction, independently of the body temperature, the feathers always lie flat and not ruffled as in the birds where the thalamus is not injured. This the writer makes no attempt to explain but it was found that if a decerebrate bird whose feathers are characteristically fluffed be given a small dose of pilocarpine the feathers in this bird will also lie flat and in this condition the temperature of this bird varies with the environment just as does that of the bird with thalamic lesion. This suggests that the body temperature changes may be secondary to that of the feather changes.

Ewald long ago showed that in birds, where presumably the vestibular apparatus is especially finely adjusted with reference to flight, that the normal nystagmus reactions persist after loss of all the fore-brain anterior to the thalamus. It is now found that in birds where the thalamus has also been removed, these same normal nystagmus reactions of the eyes and head persist provided the body temperature be kept normal. Hence nystagmus, primary and secondary of the eyes, and the compensatory nystagmus of the head persists after complete removal of all the brain anterior to the mid-brain. If the body temperature be allowed to fall below  $35^{\circ}$  C. the quick component of the nystagmus disappears with retention of the deviation or slow component. With still further reduction of the body temperature deviation may also disappear but still retain the compensatory reactions of the head.

The causes of the spontaneous movements of the bird with cerebrum and thalamus both removed, provided a normal body temperature be maintained, the writer is at present unable to discuss. Experimental study of this phase is in progress.

It is also desired to record the following facts. In testing the possibility of reflex pathways in the thalamus related to visceral activity, the following experiments have been done. The gastric contractions were studied by the balloon method after previously decerebrating a turtle, leaving the thalamus in situ. In such an animal hunger contractions will occur (Patterson). It was found that electric stimulation of this part of the brain stem anterior to the optic lobes may modify the gastric contractions in either a positive or negative way, either of stimulation or inhibition. The same strength of current applied to the meninges did not cause these changes. The positive stimulation resembles that obtained by stimulation of the medulla but the contractions are not so vigorous. Furthermore the same stimulation will also be followed by cardiac inhibition which may be prolonged. The possibility that these effects may be due to spread of current can not be absolutely excluded but the same stimulus applied to the cortex of the optic lobes did not give these effects.

The decerebrate bird gives only an avoiding reaction to other birds. In order to find what part of the cerebrum must be present to give other than avoiding reactions to other birds, experiments were carried out on paired pigeons in which various parts of the cortical part of the fore-brain were destroyed, leaving the main mass of the corpus striatum intact. It was found that removal of the entire surface of the fore-brain through a thickness of about one eighth of an inch from a female did not prevent her normal mating reactions with the male. The entire courting cycle was gone through with as described by Craig. Two eggs were laid but she did not incubate them. In the male removal of the surface of the cerebrum in a similar way, it was found that he would give only part of the courting cycle, but did not mate with the female. The removal of the entire supra-ventricular cortex and part of the medial cortex, leaving the anterior third of the cerebrum untouched, from a female was followed by a normal courtship, mating, laying of eggs and incubation with hatching of two birds. The male did not share in the work of incubation. But after the young birds were hatched she paid little heed to them; the male fed them nearly altogether, she did it rarely (observed to feed them twice only). Certain it is, that the "decorticated" female will go through the entire courting and mating cycle in the absence of the cortical part of the cerebrum, but so far as my experiments now go, she will not incubate the eggs. Or if the lesion is less extensive she will incubate the eggs but will not take normal care of the young birds.



# A CASE OF PSEUDOSCLEROSIS ASSOCIATED WITH A PSYCHOSIS<sup>1</sup>

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In order to understand the symptoms shown by our patient it is necessary to mention briefly several of a number of symptom complexes which are more or less closely related. They are: (a) Pseudosclerosis, the Westphal-Strümpell disease, first described by Westphal (1883) and later by Strümpell (1896). As first described, the disease was said to be without definite anatomical changes in the central nervous system. Histological studies under modern methods of staining were later carried out by Westphal, Strümpell, Hösslin and Alzheimer, and others. The chief symptoms of pseudosclerosis maybe considered under the following heads: (1) involuntary movement, usually a tremor; (2) muscular rigidity; (3) mask-like face; (4) speech disturbance, usually not a scanning speech; (5) occasional dysphagia; (6) occasionally pigmentation of the margin of the cornea; (7) occasionally apoplectiform or epileptiform attacks; (8) gait and attitude; (9) psychic disturbances; (10) clinical course.

1. The abnormal movement in pseudosclerosis is usually a true tremor, that is, a rhythmical alternate contraction and relaxation of antagonistic muscles, usually three to five per second. The tremor is of the intention type. It usually ceases in rest, but is increased by emotion or the least voluntary movement. There is not the ataxia seen in multiple sclerosis. The tremor may begin in either the upper or lower extremities, finally all extremities and the head are involved, the upper extremities as a rule more severely and earlier than the lower. In the fingers Pollock,<sup>2</sup> has compared the motion at the thumb and index fingers to that of shooting marbles.

2. Muscular rigidity is present, and toward the end of the dis-

<sup>1</sup> Read before a meeting of the Philadelphia Neurological Society, January 25, 1918. Received for publication August 1, 1918.

<sup>2</sup> Pollock, L. J., JOURN. OF NERV. AND MENT. DIS., 1918, Vol. 47, p. 219.

ease may become considerable; but muscular rigidity is much more conspicuous in Wilson's disease (progressive lenticular degeneration).

3. Whereas in Wilson disease a spastic like smile is most often seen, in pseudosclerosis the expression is most often mask-like, that is, like in Parkinson's disease (paralysis agitans). Thus Bostroem<sup>3</sup> mentions a mask-like face in nineteen out of twenty-two instances.

4 and 5. Some speech disturbance is present in nearly every case of pseudosclerosis, though it may not always be very marked. In Bostroem's<sup>3</sup> twenty-two cases one patient was without speech disturbance; sixteen patients showed some difficulty in articulation; one patient (Westphal's case) had a scanning speech. The speech difficulty is marked by stammering, slurring or indistinctness. Difficulty in swallowing was present in ten of Bostroem's<sup>3</sup> cases.

6. Here might be mentioned incidentally circumcorneal pigmentation, which has been reported in some cases of pseudosclerosis. How much this is entirely characteristic of pseudosclerosis is not known. Pollock<sup>4</sup> has reported a case, which both clinically and anatomically he considered Wilson's disease in which corneal pigmentation was present. This case of Pollock's will be mentioned again.

7. Apoplectiform and epileptiform seizures are by no means constant in pseudosclerosis.

8. The rigidity imparts a peculiarity to the gait, which is sometimes spastic-like, though it is seldom that the toes are scraped along the ground. Later the gait becomes tremulous or impossible. Propulsion is sometimes present (Spiller,<sup>8</sup> Pollock<sup>2</sup>). The elbows are often held in a flexed and abducted position. In other words, the appearance resembles somewhat that of paralysis agitans.

9. Psychic disturbances will be considered later.

10. The disease is not hereditary;<sup>5</sup> but is occasionally familial. The tremor or rigidity begins in one limb, gradually the others are involved. The onset is usually between the fourteenth and twenty-sixth year, at times in the early thirties. It develops slowly, is chronic, and usually ends fatally in the fourth decennium. At autopsy cirrhosis of the liver is often found, though this seldom gives rise to symptoms during life.

*Variations in symptoms and pathology, differential diagnosis.*

The question of the variations in the symptoms of pseudo-

<sup>3</sup> Bostroem, Fortschritte der Medizin, 1914, Nos. 8 and 9.

<sup>4</sup> Pollock, L. J., JOURN. OF NERV. AND MENT. DIS., 1917, Vol. 46, p. 401.

<sup>5</sup> This may not be true. See footnotes 12 and 13.

sclerosis is bound up with a consideration of the very identity of the disease. Just as in multiple sclerosis the variation in the situation of the lesions leads to different symptoms or varieties in that disease, so in pseudosclerosis we must consider whether we are dealing with a single disease condition; or with a number of diseases; indeed, pseudosclerosis as an entity has been questioned. A difference of opinion in classification often exists in a given case. Very interesting are those cases which show symptoms which are not exactly typical either of pseudosclerosis, progressive lenticular degeneration, or juvenile paralysis agitans. Such cases are those reported by Thomas,<sup>6</sup> and the one reported by Sawyer.<sup>7</sup> Wilson saw the latter case and expressed doubt as to the diagnosis. In the case reported by Pollock,<sup>4</sup> mentioned above, at autopsy the changes in the basal ganglia were limited to the lenticular nucleus, and Pollock's ante-mortem diagnosis was progressive lenticular degeneration, but from the description given our diagnosis would have been pseudosclerosis.

In pseudosclerosis involvement of the pyramidal tracts, with corresponding symptoms (Babinski's reflex, ankle clonus, etc.) have been reported (Westphal, Schütte, Lhermitte, Hösslin and Alzheimer). In Hösslin and Alzheimer's case there was secondary degeneration of the pyramidal tracts.

The histological picture in pseudosclerosis and progressive lenticular degeneration is very similar, though in progressive degeneration the process tends to terminate in softening of the lenticular nucleus. In pseudosclerosis the distribution of the disease is more widespread.<sup>4</sup> Cirrhosis of the liver is not constantly found in pseudosclerosis.

Wilson's disease has a greater tendency to be familial than pseudosclerosis, but familial instances of the latter have been reported. (As the cases of Rausch and Schilder, Oppenheim, Cadwalader, and Spiller.<sup>8</sup>) Wilson himself regards progressive lenticular degeneration as closely related to pseudosclerosis.

(b) *Progressive lenticular degeneration.* (Wilson's disease.) The disease described by Wilson<sup>9</sup> has briefly the following characteristics: It has a tendency to be familial. The onset is between the tenth and twenty-seventh year; it sometimes runs as acute or subacute course (4-13 months) but is more commonly chronic (3-9

<sup>6</sup> Thomas, J. J., JOURN. OF NERV. AND MENT. DIS., 1917, Vol. 46, p. 321.

<sup>7</sup> Sawyer, J. E. H., Brain, 1912-13, Vol. 35, p. 222.

<sup>8</sup> Referred to by Spiller. Spiller, Wm. G., JOURN. OF NERV. AND MENT. DIS., 1916, Vol. 43, p. 23.

<sup>9</sup> Wilson, Brain, 1912, Vol. 34, p. 295.

years). It will thus be seen that the disease has a tendency to run a shorter course than pseudosclerosis. Rigidity is a very prominent symptom; as the disease progresses the limbs are held in a contracture-like position.

Strümpell<sup>10</sup> thinks that rigidity is the fundamental symptom in Wilson's disease, tremor is pseudosclerosis. The abnormal movement in Wilson disease is usually a true tremor. According to Hunt,<sup>11</sup> the tremor in Wilson's disease is an action tremor, not an intention tremor. The speech is disturbed and scanning-like, though the scanning differs from that seen in multiple sclerosis. Both the dysarthria and the dysphagia appear to be somewhat more prominent in Wilson's disease than in pseudosclerosis. The patient often shows spastic smiling. Psychic changes are often present. Involvement of the pyramid tracts is lacking, there is absence of nystagmus, eye-ground changes and bladder disturbances. At autopsy cirrhosis of the liver is constantly found, though this seldom gives rise to symptoms during life.

(c) *Juvenile Paralysis Agitans*.<sup>11</sup>—This will be considered later. The conditions which have been ascribed to changes in the lenticular nucleus are:<sup>8</sup> Wilson's progressive lenticular degeneration, the pseudosclerosis of Westphal and Strümpell, Parkinson's disease (paralysis agitans), spastic pseudobulbar paralysis with contractures, choreo-athetoid movements of Oppenheim and Vogt, Oppenheim's dystonia muscularum deformans, progressive athetosis, also probably v. Becterev's hemitonia apoplectica, and certain forms of carbon monoxide poisoning.

*Mental Symptoms of Pseudosclerosis*.—Without attempting to analyze in detail the mental symptoms of pseudosclerosis and Wilson's disease it may be said that the mental symptoms of these two affections are of some slight value in differential diagnosis. There is seen in many cases of Wilson's disease what might be termed a mild dementia.

The mental deterioration, according to Wilson, is not great. He found no great loss on the receptive side. "There is a narrowing of the mental horizon, but within the limits of his constricted mental field his (*i. e.*, any patient's) power of perception and recognition are good." In addition to this slight mental loss, there is in Wilson's disease what might be termed either an euphoria or an overflow of emotionalism. The patient is childish, easily aroused to laughter, never to crying. Finally Wilson noted hallucinations or delusions

<sup>10</sup> Strümpell, A., *Spezielle Pathologie und Therapie*, ed. 1914, Vol. 2, p. 760.

<sup>11</sup> Pollock, l. c.

in two cases, which were very transient.<sup>9</sup> In pseudosclerosis there was "impairment of intellect of more or less degree" in fifteen of Bostroem's twenty-two cases.<sup>3</sup> Instead of the euphoria seen in Wilson's disease there sometimes occurs irritability, or actual manic or confusional attacks, in which hallucinations or delusions may be prominent (cases of Westphal, Strümpell, and Hösslin and Alzheimer). Pollock<sup>2</sup> noted frequent crying spells and finally considerable depression in one of his cases. Therefore irritability, excitement, confusion, distinct psychoses, perhaps greater mental impairment than occurs in Wilson's disease, as well as epileptiform and apoplectiform attacks, speak in favor of pseudosclerosis.

*Case Report.*—The case here reported is one of a family that has already been reported by Spiller.<sup>8</sup> In Dr. Spiller's article will be found photographs of two of the patients, one of whom is at present our patient. At the time of Dr. Spiller's report the man presented no mental symptoms.

The family consists of four brothers and one sister. William, who gives the history, is the only one of the children who is not afflicted. The mother is eighty-one years old, living and well. The father died at the age of sixty-eight of pulmonary tuberculosis.

The father's sister's daughter (niece) who is fifty years old, is said to have paralysis agitans. Further details about her condition could not be obtained. In this connection it is interesting to note the findings of Higier,<sup>12</sup> and of Hunt. The former reported two brothers, one whom he believed to be a case of pseudosclerosis, the other progressive lenticular degeneration. Their father, Higier learned, at about his thirty-fifth year, suffered from an early paralysis agitans, which involved all his limbs symmetrically, caused his speech to be slow and drawling, and caused marked defect of the intelligence. Higier thought therefore, that he suffered either from Wilson's or the Westphal-Strümpell disease. Hunt<sup>13</sup> states that juvenile paralysis agitans is often familial, and sometimes hereditary.

Catharine, aged fifty years, has had a tremor for the last fifteen years, and is now scarcely able to walk; her spine is twisted. Edward, aged forty-nine years, has had symptoms for from seventeen to twenty-one years, including propulsion for five years. He is now confined to bed in the Philadelphia Hospital. Miles, aged thirty-eight years, has had a tremor for five years, on account of which he has had to abandon his profession of a priest. Catharine, Edward, and Miles are said to have had typhoid fever. Perhaps this was an intestinal disturbance such as sometimes occurs in pseudosclerosis and progressive lenticular degeneration.

<sup>12</sup> Higier, H., *Zeitschrift. f. d. g. Neurol. u. Psych.*, 1914, Vol. 23, p. 290.

<sup>13</sup> Hunt, J. R., *Brain*, 1917, Vol. 40, p. 58.

William, aged forty-eight, is of very good intelligence. Several years ago he had some trouble with his eyes, which physicians thought was either tuberculous or syphilitic; he recovered, with the exception of some obscuration of his visual fields. William thinks his brothers and sister have undergone a certain amount of mental deterioration.<sup>14</sup>

John K., aged forty-seven, the only one of the affected brothers who has shown any acute mental symptoms, was first admitted to the Philadelphia Hospital in 1905, at which time he showed a tremor, the duration of which is probably twenty years, and at least thirteen. During these years he has had thirty-three admissions, usually to the drunk ward. His school career seems to have been normal. At the age of seventeen he became a pedlar, and soon thereafter began to drink. His illness started with stiffness and shaking of the right lower limb, then the right upper limb became involved, and finally the remaining limbs were involved. He showed no acute mental symptoms until recently.

The patient's present admission to the hospital began May 13, 1916. His complaint was probably fictitious,—he claimed he had had a severe pulmonary hemorrhage. In June, 1917, it was noticed that he was acting queerly. At 3 A.M., July 29, 1917, he ran away from the institution, and was returned by the police in less than an hour. He was excited and agitated, and asserted that a man had been following him to do him harm. At times he talked almost incessantly in a rambling manner, and probably had hallucinations of memory. He was practically orientated throughout. Except for slight exacerbations his condition remained stationary; he was therefore transferred to the Philadelphia Hospital for the Insane, September 6, 1917. At this time he showed mobility of attention and flight of ideas; he was restless, rambling, and possessed an exaggerated idea of his own importance, though he was not euphoric, on the contrary he was apprehensive. He thought that harm had befallen various members of his family. When he became quieter he revealed more fully his persecutory ideas, with a rather child-like reasoning. A patient was jealous of him because during his (John's) administration of a supply department in the hospital, John (so he alleges) had caught this patient stealing. (This statement of John's is not correct.) A friend of this patient had later asked John "some pointed questions," upon which John was certain that harm was impending. Other patients had called him "spy," and "hypocrite." He had been "doped," but explained that he had accidentally drunk cocaine from a cup, of which he said the patients had an abundant supply.

At one time John stated that he was the prototype of Charles Chaplin, and that a film corporation owed him a large sum of money; at another time that Charles Chaplin had been a fellow patient. Some of these statements were evidently fabrications, and were of transitory

<sup>14</sup> The various brothers, including the one who is well, have each given their ages differently. Edward states he is forty-nine years old, though he states he was born in 1867.



duration; the story of the theft and its consequences he has not retracted, though each time it is related with different variations.

John is usually good natured, at times given to attempts to be witty, or else fault-finding. This is not marked. He shows a slight but unmistakable mental reduction. There is slight impairment of memory.

*Physical Examination.*—The patient's elbows are always more flexed than they should be. His knees are somewhat more flexed than they should be. This, together with his facial expression, gives him an appearance somewhat resembling paralysis agitans. His face has a certain smoothness, together with some reduction in emotional expression, both voluntary and involuntary in the upper and lower facial muscles.

His pupils are very slightly irregular, about 4 millimeters in diameter, they react sluggishly to light and accommodation. Von Graefe's sign is present. Ocular movements are good, convergence is well maintained. The protruded tongue shows a tremor.

The patient is able to walk very slowly without increasing his speed, or, when walking rapidly, he is able to slow up when he comes to obstacles. He usually puts his heels down first. This seems to be due to the fact that his thigh is flexed too much at the times that he is ready to put his foot down. Very occasionally he scrapes his toes on the ground a little. There is no tremor of the lower extremities in walking. Together with his attitude his tremor is the most conspicuous findings on inspection. It often ceases during rest; it increases on voluntary motion or when the patient is watched. The rate is about three per second. The head moves to and fro and slightly from side to side. The tremor is most marked in the upper extremities, and at the wrist and shoulder joints. The movements in the muscles running from the scapula to the humerus is most marked in the triceps. At the elbow joint there is a movement of flexion and extension, and a not inconsiderable movement of pronation and supination. At the wrist the movement is flexion and extension. In a resting position the amount of flexion in the fingers is not much more than normal. When the movements are especially violent they are seen in the fingers to start in the metacarpo-phalangeal joint, especially on the ulnar side and to include a movement of adduction and abduction, as well as flexion and extension. The thumb and index finger are least involved; they are in a position of marble-shooting rather than pill rolling. If when the patient is holding his arm at his side, it is fairly quiet at the time, and he then brings it away from the body to a horizontal position, it shows a tremor after he has reached the latter position, and none while he is making the effort to attain this position. On picking up a pin the patient can by an effort stop the tremor enough to grasp the pin. In reaching up for a chemical flask (standing on a high shelf) to grasp it by its "neck," the tremor ceases during the motion, is slight just before he has grasped the flask, ceases when he is actually grasping it, and is most violent when he is holding it.

When the patient buttons his shirt it is noticed that the tremor increases in intensity until the time when he is actually slipping the button through the button-hole, at which time it becomes less marked. In the finger-to-nose test: In beginning the effort the tremor often ceases for a moment; during the effort it usually increases perceptibly as the nose is reached, and especially after the nose has been reached. In bringing the finger back to the horizontal position the tremor is most marked after the horizontal position has been attained. In drawing a line between two points it is seen that the line is most irregular in the end half or the last two thirds. At times it appears that the longest and highest "waves" of the lines (and hence the least in number) occupy the middle third of the line, whereas toward the end of the line the waves become smaller and nearer together. It will thus be seen that the tremor may cease at times preceding an effort; that during the effort it is least marked, and that it increases at the end of the effort and after its completion. It is therefore, a tremor of the intention-type, rather than an action-tremor.

From Wilson's description,<sup>9</sup> one would have to conclude that the tremor in progressive lenticular degeneration is an action tremor. According to Hunt,<sup>13</sup> the tremor of pseudosclerosis is an intention tremor, whereas in juvenile paralysis agitans and progressive lenticular degeneration an action tremor occurs. In the twenty-two cases of alleged pseudosclerosis that Bostroem<sup>3</sup> collected from the literature, the tremor twice resembled paralysis agitans, once chorea. (It might here be stated therefore, that in the diagnosis of juvenile paralysis agitans, which may be familial, and show disturbance in speech and swallowing, the type of the tremor and muscle rigidity, the recession of the tremor as the diseases advances, the absence of mental symptoms, and in general the more characteristic symptoms of paralysis agitans serve to distinguish this disease from pseudosclerosis.)

There is no fine tremor of the fingers in our patient such as is seen in exophthalmic goitre. The movement of pronation and supination is not well performed. In the lower extremities the tremor appears when the patient lifts his foot off the bed,—flexion and extension at the ankle, and apparently less movement in the muscles of the thigh are seen.

The resistance to passive motion is most marked in the fingers and wrist, and to a decreasing extent in the elbow and shoulder. The triceps muscle seems to be more developed than it should be. On passive flexion at the elbow, the triceps, and on extension, the biceps, seem to have more tone than they should have. Resistance to passive motion in lower extremity is most marked at the ankle.

The knee jerks and biceps jerks are exaggerated; the triceps jerks could not be obtained. The plantar reflex is flexor; there is no ankle clonus. The abdominal reflexes are uncertain, the reflexes about the umbilicus and lower abdominal quadrant were sometimes obtained. The cremasteric reflex was not obtained.



There are no sensory changes; no speech defect or difficulty in swallowing; no nystagmus; eye grounds and visual fields are normal. Fluoroscopic examination shows no apparent change in the size of the liver.

The Wassermann reaction was positive in the blood on two occasions; it was negative in the spinal fluid on three occasions, including the reaction with cholesterinized antigen. The cell count was not increased in the spinal fluid, the globulin reaction was negative. The colloidal gold reaction was in the luetic zone—25555 32000.

Edward, who is a patient in the nervous wards, one of us was permitted to see through the courtesy of the chief in whose service he is. A detailed examination was not made. In general he resembles John very much. He has been confined to bed for two years. His facial expression is like that of his brother, his tremors are more marked. When in a position of rest he holds his wrists extremely flexed; compare this with the extreme resistance to passive motion that John shows at his wrists. Apparently Edward has suffered from a vertebral injury following a fall. Recently he has had performed a tenotomy of the tendo Achilles. What the exact cause of his foot drop is, we are unable to say. His intelligence is very good.

In conclusion we might say that although an *intravital* (if indeed a pathological) diagnosis of pseudosclerosis cannot always be made, yet our patient shows the symptoms which are usually designated under the term pseudosclerosis. These include the long duration, the character of the tremor, the psychosis, and the slight mental deterioration.

34TH AND PINE STREETS.

# THE CEREBELLAR GAIT<sup>1</sup>

## A PEDEGRAPHIC STUDY<sup>2</sup>

BY I. LEON MEYERS, M.D.

CHICAGO

The term "ataxia," as employed to describe the locomotor effects produced by cerebellar injury or disease, is without significance. It implies a disturbance in the function of locomotion, a composite function which requires the collective and well-regulated activity of a large number of muscle groups undergoing different types of movement, disregarding at the same time the particular phase in that function which is actually at fault. It thus differs from the terms "spasticity" and "flaccidity," applied, respectively, to the effects produced by a cerebral or peripheral motor neuron lesion. Whereas the former implies that in the affected muscles there is loss of voluntary power which is associated with an excess activity of the reflex centers; and the latter, on the other hand, that both voluntary as well as reflex activity have been abolished, the term "cerebellar ataxia" tells us nothing, either as to the particular type of movement that is affected or as to the disturbance in the relationship of one movement to another, which is normally required in carrying out locomotion. To obtain a clear insight into the nature of the so-called "cerebellar ataxia" it would be necessary, I thought, to dissociate the general function of locomotion into its component parts and study them individually. This I endeavored to do by the studies here reported.

*Animal Locomotion.*—In terrestrial locomotion, as observed in the biped as well as in the quadruped, each step is carried out by two factors, one organic, the other physical, the first depending upon muscular activity, the latter, upon the physical laws which govern a pendulum in motion. This has been proved long ago by the great work of Borelli (1), the brothers Weber (2), by Pettigrew (3) and others.

It is thus manifest at the outset that in looking for the effects of

<sup>1</sup> From the Hull Physiological Laboratories, University of Chicago.

<sup>2</sup> Read before the Section on Nervous and Mental Diseases at the Sixty-ninth Annual Session of the American Medical Association, Chicago, June, 1918.

a cerebellar lesion, which, as is well known, is restricted to the voluntary musculature of the body, we must confine ourselves to the study of the organic factor and disregard the mechanical one which is also at play.

The organic factor in the execution of each step consists of two types of movement, extension and flexion. The extension movement in one limb inaugurates the advance of the body, the flexion movement in the other limb, the advance of that limb. One limb by extending and straightening out at the hip, knee and ankle exerts pressure on the ground which, being an unyielding medium, reacts upon the body with the same force which was exerted on it—propelling the body in the exactly opposite direction or vertically upward. The action of the ground upon the body is then of the same nature as that of the resistant water which, when forced toward the stern of the boat by the oars of the boatman, causes the boat to advance, a simile employed as far back as 1680 by Borelli. The propulsion of the body upward, the lifting of the heel above the ground, initiates a pendulum-like movement of the body, so that it rotates anteriorly at the metatarsophalangeal joint (in man, probably also the medio-tarsal joint), and is, in this manner propelled also forward. The movement of extension thus constitutes the primary, the essential organic factor which inaugurates the mechanical advance of the body with each step.

The flexion movement in the other limb inaugurates the advance of that limb. When flexed the limb becomes subject to a tendency to resume the vertical and, in accordance with the laws governing a pendulum in motion, it swings forward, rotating at the same time anteriorly at the coxo-femoral joint. It frequently, as a result of the anterior rotation, advances further than is necessary, but it then by a retrograde movement, through the action of gravity, promptly returns to the vertical and is deposited on the ground (3). Following this movement—by which the limb is mechanically deposited on the ground, it in turn extends, inaugurating the advance of the body in the next step and the cycle is thus repeated.

These two types of muscular activity, that of flexion and extension, have, as shown by the researches of Sherrington and others, different representation in the brain. Whereas the movements of extension are, as proved by the well-known phenomena of decerebrate rigidity, dominated by the tonus centers, the movements of flexion, the so-called phasic movements (Sherrington (4)), are governed by the motor cortex of the cerebrum. The tonus centers are known to be situated between the midbrain and the lower end of

the pons. There is, however, a difference of opinion as to their exact location. Ewald and Thiele (5) have placed them in the paracerebellar nuclei, while others, among them Hughlings Jackson, who based his opinion on clinical observations, proposed the view that they were in the cerebellum. Hughlings Jackson said: "The cerebellum represents movements of the skeletal muscles in the order, trunk, leg and arm preponderatingly extensor-wise; the cerebrum represents movements in the arm, leg and trunk preponderatingly flexor-wise: These impulses from the cerebrum and cerebellum antagonize or inhibit one another in the same degree as the order of the degree of their different representation of movement of the muscles of the body (6)." A lesion of the cerebellum should, in accordance with Jackson's view, exhibit itself primarily in a disturbance of that phase of movement which propels the body, in other words, at the moment when as a result of the contraction of the extensors of the limb on the ground, the advance of the body is initiated. By studying the changes in this component of animal locomotion, light might be thrown on the actual disturbance brought about by the lesion which otherwise escapes us. For this purpose the graphic method employed by Marey for the study of normal locomotion would be, I thought, of the greatest service.

While chronophotography (zoöpraxography) as developed by Muybridge (7), Marey (8) and others would be of greater utility in indicating the positions of the body and limbs while in motion, our problem here is concerned mainly with the organic factor involved in the initiation of each step, at the precise moment when tonic activity (extensor contraction), as opposed to clonic activity, sets in. This is hardly indicated by chronophotography (see zoöpraxography or animal locomotion, 11 volumes of photographic prints by Eadweard Muybridge), but is, on the other hand, shown very well in the graphic records.

*The Graphic Method.*—Marey (9) was the first to apply this method to the study of the complex movements of normal locomotion and thus established it on a scientific basis. In men as well as animals he employed a peculiarly constructed shoe which, when worn by the subject so studied during walking, running, etc., furnished graphic records of the phases of each step, the rhythm of the gait, as well as the intensity of the pressure on the ground. The sole of the shoe contained an India-rubber air chamber which communicated by a long rubber tube with a recording tambour, the writing point of which was in contact with a portable revolving cylinder. He applied such a shoe to each foot of the animal, and as the air

chambers were alternately compressed and expanded while the animal was in motion, the movements of its limbs were thus registered on the revolving drum. The revolving cylinder was carried by the person whose gait was to be determined, and in the case of a horse by a rider. In the horse Marey also employed a complicated ap-

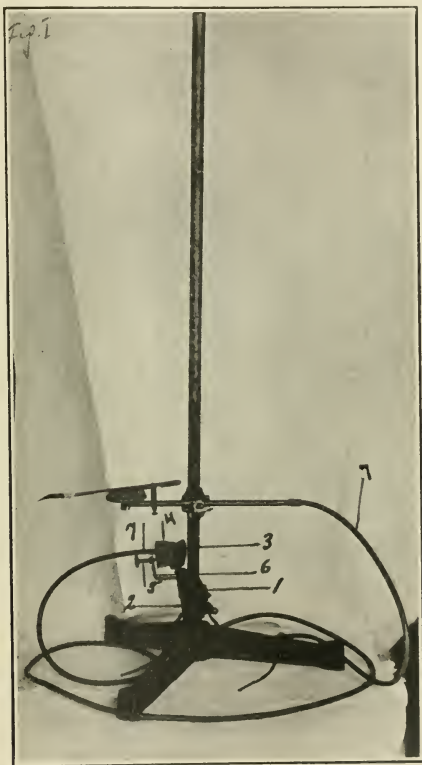


FIG. 1. Apparatus for taking gait-records.

paratus which was applied to each leg of the animal above the fetlock joint, and in which pressure on the air chamber was exerted through a ball of lead sliding on a bar placed parallel to it. Neither of these contrivances could be employed in the dog. The small size of its feet and the absence of a hoof make it impossible for it to be

shoed in the matter described for horse or man. The apparatus applied by Marey above the fetlock joint of the horse could also not be utilized in the dog owing to the small distance between the hock and the fetlock, entirely too small to carry such an apparatus.

I have therefore devised the apparatus shown in Fig. 1. It consists of the following parts:

1. A leather band encircling the leg between the hock (ankle joint) and the fetlock and laced tightly in the back by shoe laces.

2. A metal insert placed in the front part of the leather band, and somewhat concave to conform to the convexity of the limb.

3. A metal plate, somewhat concave, which rests on the dorsal surface of the foot and terminates anteriorly over the bases of the first phalanges. It is connected with 2 by means of a hinge-joint.

4. A rubber air-chamber, carried by 3 and by its superior surface in contact with

5. A screw, fitted in the end of

6. One half of a metal arch, fastened by its base to 2. The screw serves to offer resistance to the movements anteriorly of 3 and 4, resulting from dorsal flexion of the feet, thus bringing about a compression of the air-chamber during all such movements. It also enables us to equalize the pressure in the air-chamber on all four feet.

7. A communicating tube which is connected by rubber tubing with a recording tambour, allowing the air during the compression of the air-chambers to escape into the latter and thus furnish us graphic records of the phases of each step.

In carrying out my experiments I applied such an apparatus to each foot of the animal. To eliminate the necessity of using exceedingly long rubber tubes and to enable me to carry out these experiments in the ordinary-sized laboratory, I put the dog in harness and hitched it to a small wagon which carried the kymograph and the ring-stand with the four recording tambours (one for each limb), so that the animal in walking carried the recording apparatus with it, registering at the same time the movements of its limbs. The rubber tubes leading from the air-chambers to the tambours were passed through rings fastened to the harness to prevent the animal from stepping on the tubes while walking (Fig. 2).

Before carrying out the experiments it is of course essential to make certain that the air-chambers and tambours do not leak; also—as one of the objects of the experiments is to determine the rhythm of the limbs in motion—that the writing points of the levers touch the drum in exactly the same vertical line.

*The Normal Gait.*—Fig. 3 is a record of the normal gait of the dog. It was obtained from the first dog in the experiments here reported before it was subjected to the cerebellar operation. Perfectly identical results have been obtained also from the second dog. The records, it will be seen, are subject to tremors and irregularities due to jarring of the apparatus in passing over the uneven floor. The following features of each step can however be definitely noted: The vertical line labelled *a* corresponds with the movement of extension, the movement which initiates the step and propels the body upward and forward. By this movement the heel is raised above the ground thus compressing the air chamber on the foot, the escaping air is being communicated to the recording tambour causing

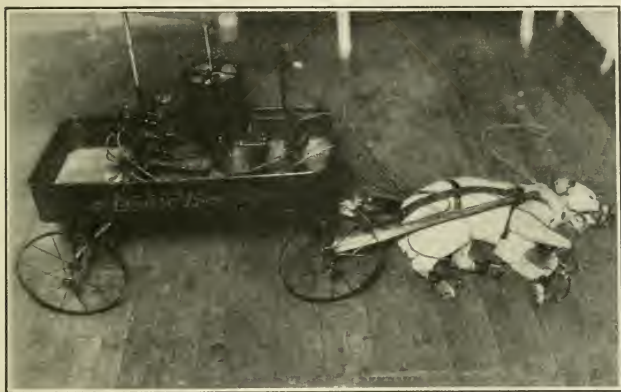


FIG. 2. Method of carrying out the experiments.

the writing lever to rise. The force and rapidity with which the air-chamber is compressed gives the writing point considerable momentum, so that it reaches a height far above what it would reach through the mere expansion of the tambour. It, however, promptly falls and is then maintained at the normal level.

An additional rise in the height of the curve is indicated on the record by the letter *b*. It is chiefly noted in the records from the hindlimbs which, as will be shown subsequently, are the prime movers of the body forward. It commences at about the middle of the period during which the foot is on the ground, and is produced by an intensified contraction of the extensors, causing the pressure on the ground to be in excess to that



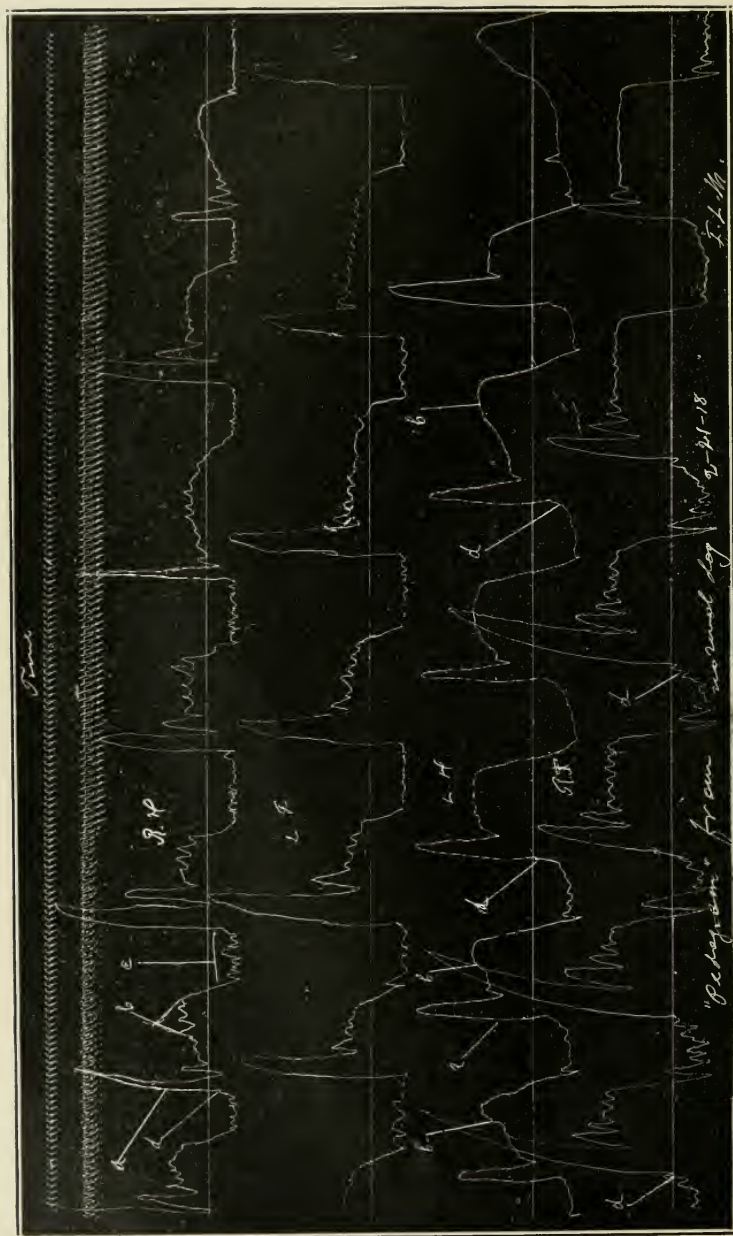


FIG. 3. Gait-record from normal dog.



of the body weight. This excess pressure has been estimated by Carlet (10) for man to be amount one fifth of the body weight. While I have no direct measurements of it it probably amounts to about the same proportion in my records. The supplemental contraction of the extensors brings about the completion of the step and terminates only with the removal of the toes from the ground, at which moment the pressure on the air-chamber is of course released. The low curve, indicated on the record by *c* corresponds with the time the foot is off the ground. Its commencement does not necessarily indicate a movement of flexion in the limb as the pressure in the recording tambour is released at the moment the toes are removed from the ground, probably a considerable time before the actual flexion sets in. The graphic method as employed in my experiments is therefore of very little utility for the study of the phases of movement which occur while the foot is in the air and swinging forward. These phases of movement should preferably be studied by chronophotography. The swinging limb in returning to the vertical, in pendulum-fashion, strikes the ground with the large metatarsal pad (corresponding to the eminence of the heel in man), before the extension movement of the limb sets in. In doing so it slightly compresses the air-chamber causing a slight rise of the writing lever. This is indicated on the record by *d*. It is frequently distinguishable from the vertical line produced by the extension movement of the limb. More often, however, these two phases are concurrent, so that the rise of the writing lever caused by them forms one continuous line.

Other features shown by the record are as follows:

1. That the hindlimbs are the prime movers of the body forward. They extend first, this movement in each hindlimb being followed by a similar movement in the diagonally opposite forelimb. This fact has been recognized by Percivale (11) long ago. He said: "I have more than once had occasion to direct attention to the important function performed by the hindlimbs in the acts of progression, and to contrast these with the comparatively light duties of the forelimbs. While the former, like a pair of oars at work in a boat, are plying forward and backward forcing the body onward, the latter, more like a pair of stilts, are employed in sustaining the propelling parts, lest the body fall forward and to the ground." This is also in accord with the well-known fact that in almost all quadrupeds the posterior extremities are much more developed than the anterior, while in some species, as the kangaroo, the jerboa, etc., the anterior limbs are practically rudimentary.

The record shown in Fig. 3 is typical of the great majority of the records which I have obtained from the gait of the normal dog. In them the extension movement in the forelimbs followed closely that of the diagonally opposite hindlimb. In some instances, however, this movement in the forelimb did not set in until the contralateral hindlimb was about to leave the ground. Such a record is shown in Fig. 4. In either case, the relationship of one limb to the other in each diagonal biped (*e. g.*, left forelimb and right hindlimb and so on) was in the normal dog the same as that of the other diagonal biped.

2. The duration of the period, during which the foot is on the ground is about  $2\frac{1}{2}$  times that during which the foot is in the air, a time relationship obtained also by Marey in his studies of the pace of the horse.

3. The forelimb, whether right or left does not extend until its ipsilateral hindlimb is off or is about to leave the ground. These two limbs are in the normal dog practically never on the ground at one and the same time.

*The Cerebellar Gait.*—This report is based on graphic studies of the gait of two dogs, each with a different lesion of the cerebellum, one affecting the forelimb, the other its diagonally opposite hindlimb. The method of procedure in carrying out the experiments was identical in both dogs. It was as follows:

I first trained the dog to walk normally with the apparatus fastened to it. This is very difficult to accomplish, the ordinary laboratory dog being at first exceedingly averse to doing so. It most generally lies on the ground motionless. Two or three weeks of persistent training brings about, however, the desired result, so that the animal learns to get up and walk at the sound of the revolving drum. In fact, it does so unfailingly. The various records of its gait were then obtained until they all proved to be of a consistent uniformity. I also controlled these records by frequently changing the relationship of the air-chambers to the recording tambours, so that each air-chamber was at different times connected with different tambours.

When I was assured that the animal walked with uniform regularity it was subjected to the cerebellar operation. In the first dog which was operated on March 13, 1918, I extirpated the left crus primum (Fig. 5) or the lobule which corresponds to the Lobulus Semilunaris inferior in man. When the animal recovered from the immediate effects of the operation it showed the typical phenomena which are associated with such a lesion, as described by Van Ryn-

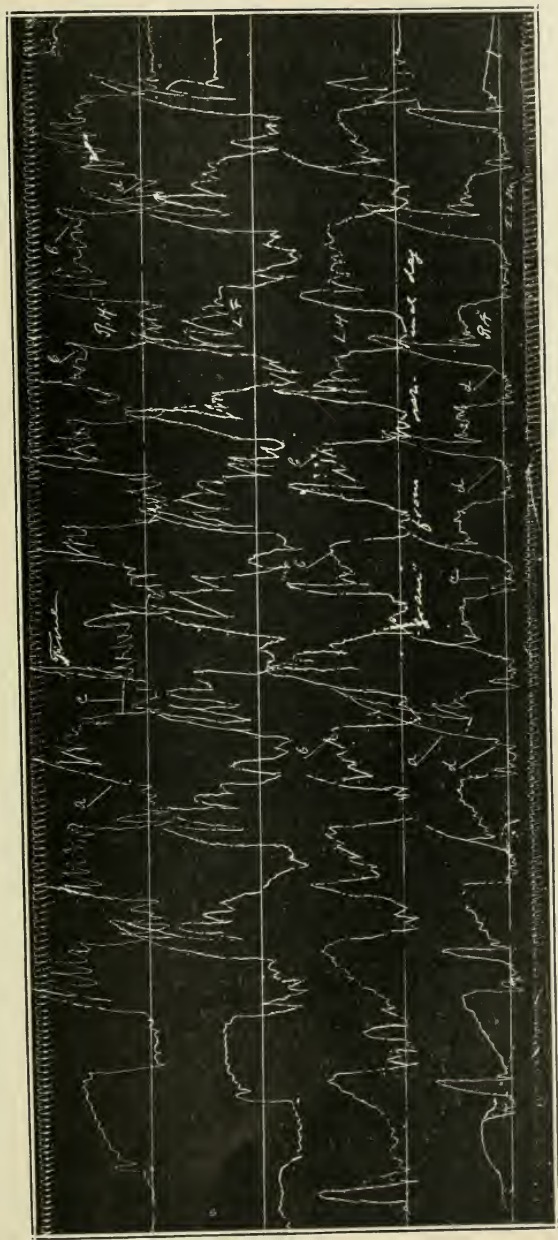


FIG. 4. Gait-record from normal dog (see text).

berk (12), Rothmann (13) and others. In walking it exhibited a marked ataxia in the left forelimb, and was subject to a frequently recurring tendency to fall toward the left side. The posterior extremities, on the other hand, remained totally unaffected. The ataxia in the left forelimb, while unmistakably present, was exceedingly difficult to interpret. It generally appeared that the animal in walking lifted the affected limb too high; at times, however, it appeared, that the disturbance was of a different character.

These phenomena were very marked for about three days and then began to subside so that seven or eight days after the operation the animal has, to all appearances, completely recovered. It then walked and ran about in a perfectly normal manner. Following the operation graphic records of the dog's gait have been taken

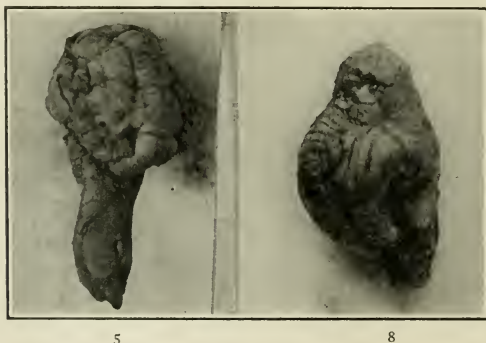


FIG. 5. Brain of dog with lesion of left crus primum.

FIG. 8. Brain of dog with lesion of right crus secundum (also partial lesion of right paramedian lobule).

practically every day for fourteen days. Those obtained during the first few days were entirely too irregular to warrant any conclusions to be drawn from them. The animal, owing to its general depression and its tendency to fall to the left side only took one or two steps at a time and then stopped.

The records, on the other hand, which were obtained after the third day following the operation until and including March 23, were of marked regularity and showed the following characteristics (Fig. 6):

First: The extension movement in the affected forelimb sets in prematurely. Instead of following its diagonally opposite hindlimb

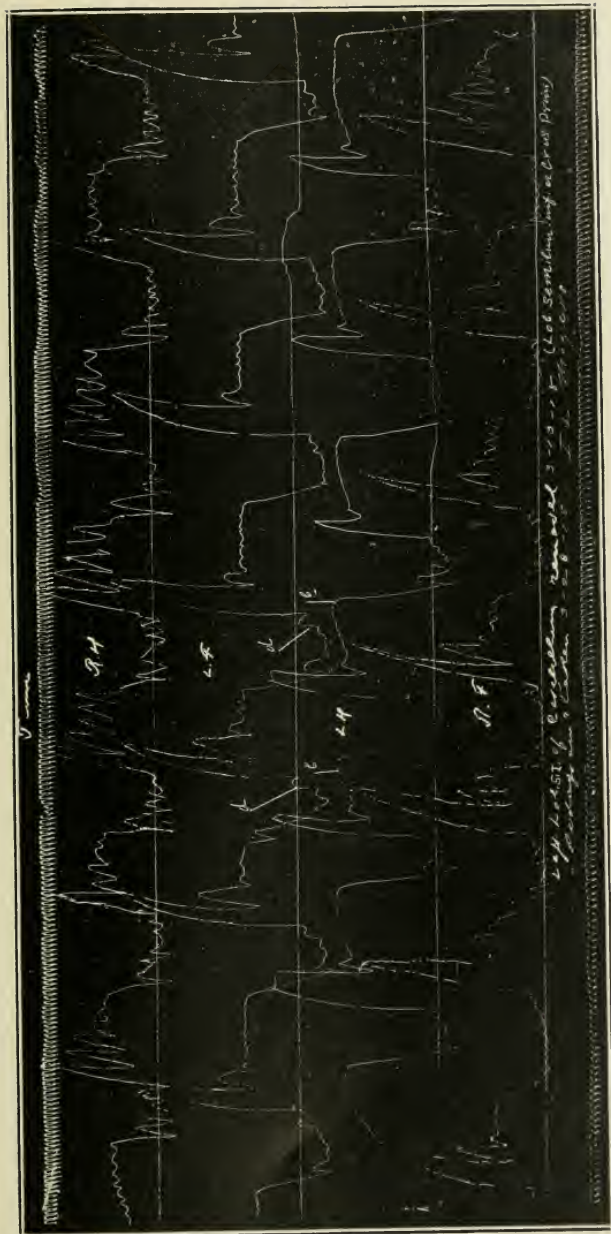


FIG. 6. Gait-record from dog whose brain is shown in Fig. 5.



after the lapse of a certain interval, as is the case in the normal diagonal biped, it sets in simultaneously, or almost so, with the latter limb. As a result of this premature activity of the affected limb the animal (as shown by the record) exerts pressure on the ground with that limb while its ipsilateral hindlimb is still on the ground, thus projecting the body toward the left. This probably accounts for the tendency of the animal to fall to that side.

Second: A study of the numerous records obtained from the animal with a lesion of the left *crus primum* (and also, as will be shown presently, from the one with a lesion of the *crus secundum*) leads me to conclude that in addition to the premature activity of the extensors in the affected limb, there is, as a result of the lesion, a tardiness in the activity of these muscles in the diagonally opposite hindlimb. This change in the latter limb is probably an indirect effect brought about by the premature extension of the affected forelimb, as a result of which the forelimb becomes a propelling part, an integral factor in the advance of the body, thus assuming momentarily the function ordinarily carried out by the hindlimb. The delay in the extension movement of the diagonally opposite hindlimb is also favored by the tendency of the animal to fall toward the left side which thus serves to keep the limb on the right side off the ground.

Other changes noted in the record are as follows:

The low curve of the left forelimb (the affected limb) is shorter than that of the right, the normal limb. The low curve of the diagonally opposite hindlimb is, on the other hand, longer than that of the left hindlimb. This is, of course, inevitably brought about by the premature extension movement of the affected forelimb and the tardy extension movement in its diagonally opposite hindlimb. As to the particular phase of movement which is thus indirectly affected during the time the low curve is registered, we are unable to draw any conclusions from the records. It should be borne in mind that the low curve merely indicates the time during which there is no compression of the air-chamber on the foot. It thus commences at the moment the toes are removed from the ground, while the foot is still behind the advancing part of the trunk, and corresponds to all the time during which the limb, by a movement of flexion and an additional movement of anterior rotation at the hip-joint, is advancing, and finally to the time it—in pendulum-fashion—returns to the vertical and is deposited on the ground again.

When the animal walks with regularity, so that one diagonal biped keeps pace with the other, the duration of the high curve of

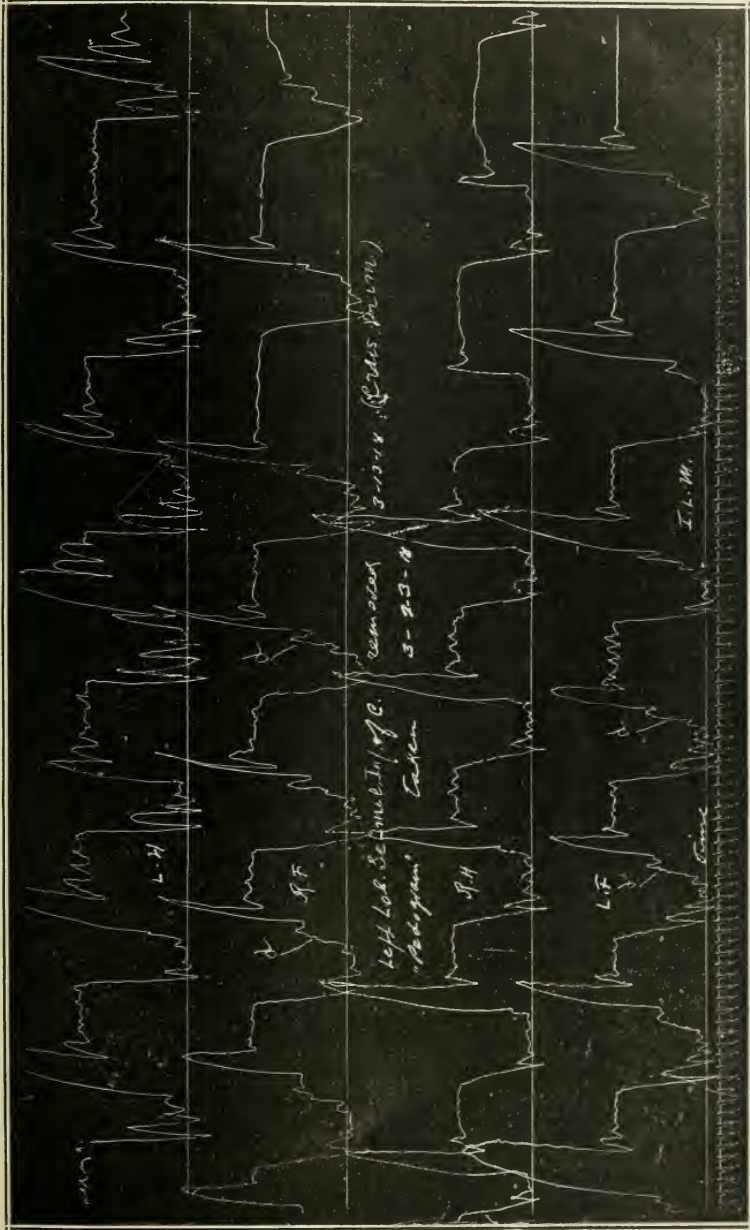


Fig. 7. Gait-record from dog whose brain is shown in Fig. 5. (The order of the connection of the air-chambers on the animal's feet with the tambours is here reversed.)

the record, indicating the time during which the foot is on the ground, is in the affected biped changed, so that it is longer in the left forelimb than in the right, the normal, forelimb, and shorter in the diagonally opposite hindlimb than in the ipsilateral hindlimb. This corresponds of course with the reverse changes noted in their respective low curves of the record. Such regularity of pace is not however always present, and these changes are consequently inconstant.

Fig. 7 shows a record from the same dog, which was obtained on March 23, ten days after the cerebellar operation. In this record, it will be noted, the connection of the air-chamber with the tambours has been reversed so that on the upper two lines the movements of the normal biped and on the lower two lines the movements of the affected biped were recorded. The record, in addition to the changes noted in Fig. 6, shows also that there is no change from the normal in the manner or force with which the flexed and advancing limb returns to the vertical and is deposited on the ground. The line *d* produced by the heel which during this process strikes the ground, is thus of the same height in the affected as well as in the normal limb. The changes noted in the record were clearly marked until March 23, or ten days following the operation. After that date they became rather indefinite.

The second dog was operated on April 13, 1918. Like the first dog, it was trained to walk normally with the apparatus attached to it and was subjected to the operation only after the records from its gait had proved to be uniform in character and identical with the normal records from the first dog. In this second dog I extirpated the crus secundum and partly injured the paramedian lobule on the right side (Fig. 8), lobules which correspond in man, respectively, to the lobulus biventer and the tonsil. On its recovery from the immediate effects of the operation the dog showed distinct ataxia in the right hindlimb and a tendency to fall backward and to the right. These phenomena, which were in accord with the results obtained by others (12), continued to be marked for several days and then began to subside, so that 8 or 9 days after the operation the animal, to all appearances, was perfectly normal. Records from its gait have been taken almost daily until April 23 and several more records after May 1. As in the case of the first dog the records obtained during the first two days were too much disordered to be considered reliable. Those, on the other hand, that were obtained after that were of striking uniformity (Figs. 9 and 10). The records showed that the effects produced by the lesion of the crus secundum



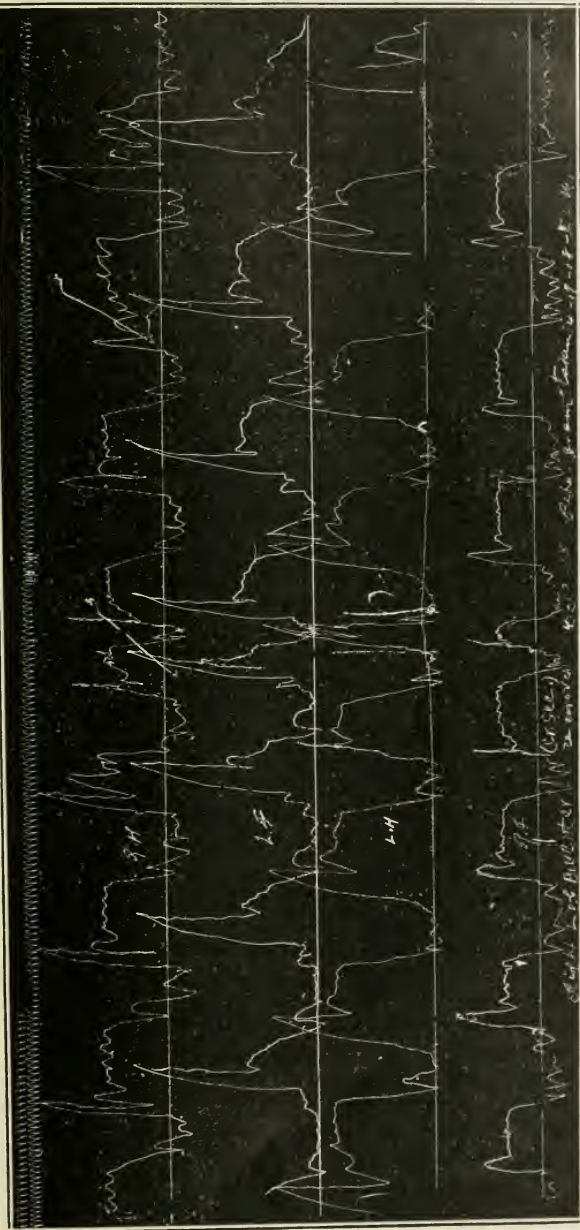


FIG. 9. Gait-record of dog whose brain is shown in Fig. 8.

were of an identically the same character as those produced by a lesion of the crus primum, the only difference being that the limbs affected by their respective changes by the former lesion were the reverse of these affected by the latter lesion. Whereas in the first dog, with a lesion of the left crus primum, it was the extension movement of the left forelimb that set in prematurely, in the second dog, with a lesion of the right crus secundum, it was the right hindlimb that was so affected. And furthermore, as in the case of the lesion of the left crus primum, an effect directly opposite to that of the primarily involved hindlimb has been invariably noted in its diagonally opposite forelimb, there being a tardiness in the extension movement of that limb. This last phenomenon has been even more marked after the lesion of the crus secundum than after a lesion of the crus primum, as is clearly shown by the record. The tardiness in the extension movement of the left forelimb is probably here, too, only an indirect effect brought about by the premature extension of the primarily affected hindlimb, and the resulting tendency of the animal to fall backward and to the right, as owing to this tendency the weight of the body is shifted in a direction opposite to that of the left forelimb, serving to keep it off the ground a little longer. The tendency of the animal to fall backward and to the right may be due to the fact that the ataxic hindlimb in extending too early brings about a condition (as shown by the record) in which the animal during the period of intervening between the extension movement in the affected biped stands for a moment exclusively on that limb, so that the weight of the body is shifted in the direction of that limb.

As in the case of a lesion of the crus primum, changes in the duration of the low curve of the record (corresponding, to the time during which the foot is mostly off the ground) as well as that of the high curve (corresponding to the time during which the foot is on the ground), were generally observed also after a lesion of the crus secundum, the respective changes for each limb of the affected biped being however the reverse of these noted after the former lesion. The duration of the low curve of the right hindlimb was thus shorter than that of the left, the normal, hindlimb; that of the left forelimb longer than that of the right (the normal) forelimb, changes directly opposite to these being noted in the duration of the high curve of these limbs.

These changes in the records from the second dog were noticeable as late as May 1, or 19 days after the operation. They were rather indefinite, however, after that date.

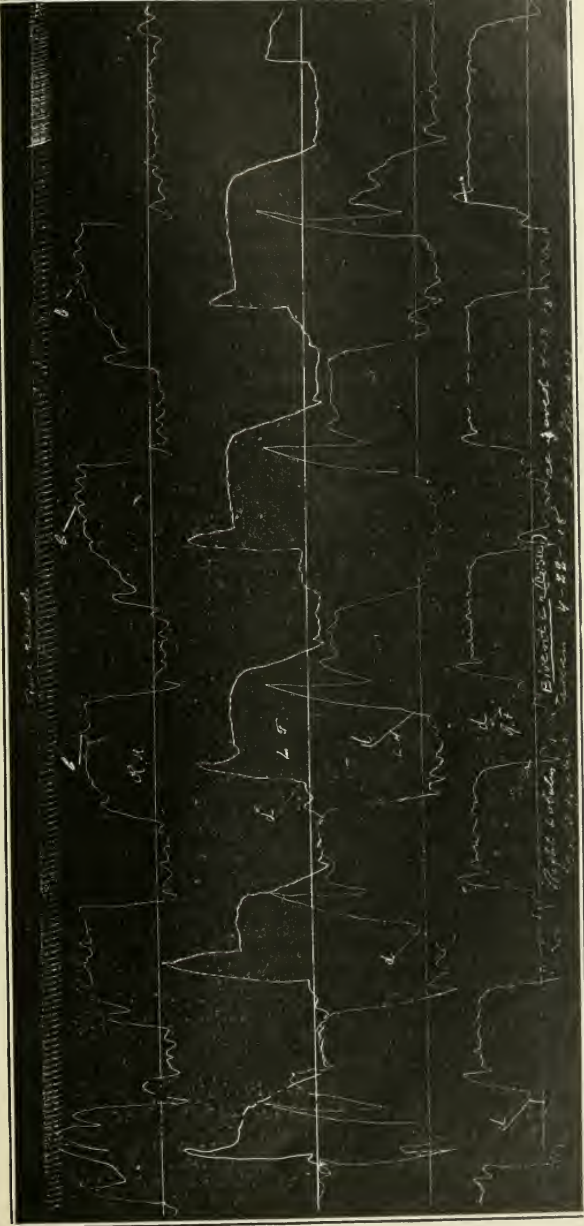


FIG. 10. Gait-record of dog whose brain is shown in Fig. 8. (Ten days after the operation.)

In looking for any evidence of muscular weakness in the limbs, the well-known asthenia of Luciani (14), we find nothing in the records to indicate this. The pressure on the ground as indicated by the height of the curve has been apparently the same after the operation as well as before. This is true of both, the height of the curve which is produced by the pressure equal to the weight of the body which is rotating anteriorly compresses the air-chambers, as well as the supplemental rise in the curve, which in the case of the hindlimb, as stated above, is produced by an intensified contraction of the extensors, exhibiting additional pressure on the ground, about one fifth in excess to that of the body weight.

The results obtained thus indicate that following a lesion of the cerebellum the excitability of the tonus centers for the affected limb is augmented, so that they respond to the proprioceptive stimuli which bring about the contraction of the extensor muscles (15) quicker than in the normal. This is at variance with what we would expect if we were to assume with Hughlings Jackson that the cerebellum represents the extensor movements. It rather tends to confirm the hypothesis, based on other experimental evidence, which I have advanced in my other publications on the cerebellum (16), namely that the function of this organ is to inhibit, control and regulate the activity of the other centers governing the musculature of the body, the tonus centers (situated most probably in the paracerebellar nuclei), as well as the motor cortex of the cerebrum.

*Summary.*—The graphic records of the cerebellar gait appear to indicate

(a) That there is no asthenia (Luciani) in the muscles affected by the cerebellar lesion.

(b) That there is no arrhythmia in the sense that Luciani employed this term, *i. e.*, to denote an unsteadiness or tremor in each single contraction of the affected muscles. A study of the records showed that the vertical line *a*, corresponding to the contraction of the extensors at the initiation of each step, showed no irregularities or waviness, even in these instances where the drum was revolving with great speed, such as we would expect to find, had arrhythmia been present.

(c) That there is no difference from the normal in the force with which the flexed and advancing limb is, in returning to the vertical, deposited on the ground, so that the height of the line *d* (see Fig. 7) is the same in the affected as well as in the normal limb.

(d) That the primary, the essential effect of a cerebellar lesion is a change in the rhythm of the affected limb with relation to the

corresponding limb on the normal side, the change exhibiting itself in a hyperactivity of the extensors, so that the former limb extends and initiates the step too early as compared with the same action of the latter limb.

(*c*) And finally, that this change, in the case of an animal, is to be noted also in the rhythm of the affected limb with relation to its diagonally opposite limb, and that there appears to be a directly opposite effect in the latter limb.

This last fact may have an important bearing on the study of the cerebellar gait in man. It is well known that the mechanism of locomotion is essentially the same in man as well as animals, and that this applies also to the participation of the anterior extremities in the execution of each step. In both, man as well as quadruped, there is a synchronous diagonalism in each pace, an anterior and its diagonally opposite posterior extremity advancing and receding together. If a man walks with a stick in each hand the movements of his extremities are exactly similar to those of a quadruped, as pointed out by Pettigrew. This, I have noted, can be observed also in a person ascending a stairway with a railing on either side of him. He grasps the railing with one hand while he ascends a step by advancing the contralateral leg. (The exact rhythm in the movement of the limb, the anterior as well as posterior, during this act, a subject which might be studied with advantage clinically, I have not as yet determined.) The movements of the forelimbs, while of infinitely greater importance in the quadrupeds, serves in man, too, to prevent an excessive displacement of the center of gravity and the deviation of the body laterally (see Marey, footnote 9, p. 125) during its advance forward. This is a point which I believe deserves our serious consideration in any question pertaining to locomotion in man. It has been, however, entirely lost sight of in the study of the locomotor disturbances resulting from various diseases of the nervous system. Attention has been centered on the abnormalities which manifest themselves in the movements of each leg and no notice whatever has been taken of the possible presence of changes in the entire diagonal biped and especially in the rhythm of the primarily effected limb with relation to its diagonally opposite limb, changes which as shown by the graphic records, are marked after an artificial lesion of the cerebellum.

1827 MARSHALL FIELD ANNEX BLDG.

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# Society Proceedings

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## CHICAGO NEUROLOGICAL SOCIETY

REGULAR MEETING, APRIL 17, 1918

The President, DR. ARTHUR W. ROGERS, in the Chair

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### WAR NEUROSES

Dr. Frankwood E. Williams, acting Medical Director, National Committee for Mental Hygiene, New York City (by invitation), presented a paper entitled, "Preparation for the Prevention, Care and Treatment of War Neuroses (Shell Shock) in the American Army."

Dr. Williams stated that long before this war started there were people who realized that there were quantitative and qualitative differences between individuals. We have realized that a man with a poor heart valve was not the equal in a race of an individual whose circulatory apparatus was in good condition. We have not so much taken into consideration that an individual even with a perfect physical system, unless he also has a perfect nervous and mental system, would be handicapped. But there were those who were beginning to believe that mental disease in this country offered one of the greatest public health problems. In Massachusetts there are 3,000 new cases of mental disease going to the hospitals every year who cost the state over \$600,000; in New York there are 6,000 cases entering the hospital every year and for their maintenance and that of those who preceded them it costs the state over a million dollars a year. Ohio has another 3,000 new cases annually and pays out over \$500,000 a year. This makes a problem of 12,000 cases in these three states of persons who have never been inside of a state hospital, who have never suffered from frank mental disease and who are now going about their business who before this time next year will have been committed to one of the insane hospitals of these states.

We were coming to note that, regardless of a man's physical and mental condition, he may become a problem both to himself and the community. Before the war started, even, this had ceased to be a matter of academic interest only, and upon this was based some of our more progressive sociologic movements. But if this needed a new demonstration it has been established in the laboratory of the war. When England, Canada and France were called upon to meet the emergency of war in 1914, they got together their armies as rapidly as possible

without even adequate physical examinations and the mental side was wholly ignored. The result was that there soon came from the seat of war a return flow of nervous and mental cases long before they had reached the scene of battle. One seventh of the casualty discharges from the British army have been for nervous and mental troubles, and if you exclude from those discharged for wounds as surgical cases, the figure becomes one third. Sir John Colley says that of 200,000 pensioners on the pension list of England, 20 per cent. were suffering from psychoneuroses. In Canada 12 per cent. of soldiers returned for any cause were cases of nervous and mental disease. Originally the condition from which these men suffered was called shell shock. The medical forces were not psychiatrists and neurologists, but internists and surgeons, and any nervous troubles which could not be placed under a distinct head were grouped under the term shell shock; general paresis, dementia præcox, and the usual psychoneuroses were called shell shock. As to the cause of these war neuroses Mott and others maintained that mechanical forces are at work. Others contend that it is largely psychological. Major Salmon, who went to England to study the conditions for the Surgeon General, has grouped the cases into five different groups: (1) Those who die as the result of shell explosion without any physical injury, the supposition being that there has been injury to the central nervous system. (2) Those suffering from some sort of nervous condition following explosions, with the characteristic syndrome suggesting mechanical factors. This is the group in which Mott has been interested and has demonstrated concussion or mechanical shock as the cause of the condition. (3) Those who have been exposed to shell explosion, but whose symptoms are those found ordinarily in civil practice among the neurotics, and whose symptoms might be attributed to mechanical factors or which are overshadowed by those psychological in their effect. (4) Those in whom it is improbable that there has been the slightest damage, for the reason that they have been exposed to no more shock or concussion than those about them and whose symptoms are the outcome of or are similar to conditions found in the civil neurotic cases. (5) Those who have all these symptoms, but have never been in combat—clearly psychoneurotic cases.

The fourth and fifth groups are the large groups; the other groups are comparatively small. It is therefore believed by most of those who have studied these cases that the etiological factors involved are psychological rather than mechanical. In support of this view several things may be mentioned. (1) The striking excess among officers, which corresponds to the distribution of the neuroses with reference to education and social groupings. (2) The rarity of the neuroses among prisoners who have been exposed to mechanical shock. (3) The rarity of these symptoms among the wounded exposed to mechanical shock. (4) The clinical resemblance of the war neuroses, or shell shock, to those of civil life in which the mechanical factors are absent, but the psycho-



logical situation is very much the same. (5) Severe injury to the central nervous system and brain is not accompanied by symptoms found in shell shock. (6) The success attending the therapeutic measures employed for the psychological rather than the mechanical side.

Major Salmon has defined shell shock as an attempt to escape from an intolerable situation in real life to one made tolerable by a neurosis. The symptoms are found in widely separated fields. In the psychic field are found delirium, hallucination, dream and anxiety states; in the involuntary functions are found functional heart disorders, lowered blood pressure, vomiting, diarrhea, retention and polyuria, dyspnea, sweating; in the voluntary muscular system, paralyses, ticks, tremors, gait disturbances, contractures, convulsive movements, etc. In the special senses, pain, anesthesia, hyperesthesia, blindness, disorders of speech; in other words, no symptoms have been noted that are unfamiliar to civil practice.

When these facts were brought to the attention of the Surgeon General about a year ago, he directed Drs. Salmon, Pierce Bailey and Stuart Paton to investigate conditions and ascertain what measures should be prepared to meet the situation among the United States troops. On their recommendation a division of psychiatry was created in the Surgeon General's department, and Dr. Bailey was placed in charge. The problems before the division were three: (1) To weed out those unfit for military service because of neuropathic and psychopathic conditions. (2) To provide adequate care and treatment. (3) To return to their communities those suffering from these disorders. When this division was formed there were no psychiatrists with the exception of, perhaps, Captain King in the army. There are now 300 in the service. They have been distributed to all the camps and are making systematic examinations of all men to determine those who are unfit to serve. A report was prepared for the guidance of those who were to examine these men. This included groups of diseases and groups of symptoms for which men should be discharged,—among them being any organic lesion of the nervous system. Among them were tabes, multiple sclerosis, progressive muscular atrophy, epilepsy, hyperthyroidism and symptoms or combinations of symptoms or history. Dr. Williams elaborated on the various nervous systems and conditions which would exclude men from the service. He also read a circular letter prepared by the Surgeon General and sent to line officers to enable them to cooperate with the medical service in weeding out neurotic cases. This gave a list of personal traits and habits and reactions to the work of training which would enable the line officer to determine peculiarities which would make the case referable to the psychiatric examiner. Up to the present time, 15,000 men have been recommended by the psychiatrists for discharge, 12,000 of whom have already been discharged. The question has been raised as to whether these men should have been discharged. This has not been left to the psychiatrists alone; they have only recom-

mended to the general medical board. This number amounts to only two and a half per cent. of those who have been exempted, which is not a large percentage, and it is evident that none of them could have served. About 2,000 a month are now coming to the Surgeon General's office for discharge. It has been determined, Dr. Williams said, that the feeble-minded of every grade and the moron should not enter the service. Both England and Canada have insisted on this, following their experience. No one would question whether dementia præcox and the manic depressives should be accepted. Major Salmon had just written him from France to send no feeble-minded of any grade to France; that they be not taken into the labor battalion, for even there they must be depended on to carry out orders and instructions, which they cannot do.

The 300 psychiatrists taken into the service have made a big drain on the psychiatric resources of the country. A good many of the younger psychiatrists and neurologists have had to be taken, and in order to meet the situation seven schools have been established where all the younger men are sent for a course of instruction before taking up the work. The nomenclature used is that adopted by the American Psychological Association last June. This is of importance so that the statistics may be comparable with civil statistics. A competent statistician has been placed in charge of the statistical work so that the figures can be made available. Originally it was the intention that about a thirty-bed unit would be attached to each base hospital, but it was found that this would not handle the situation. These thirty beds are needed for observation purposes and it would be necessary to establish neuropathic wards of considerable size in the hospitals throughout the country so that the men found in the camps who cannot be immediately discharged will be transferred to one of these hospitals, where they will receive adequate attention. Dr. Williams showed on the screen graphic charts representing groups already found coming under the different headings of hyperthyroidism, epilepsy, mental defects, syphilis, etc. He said that these were among the most prominent groups.

The question has arisen as to what is to be done with these men discharged on account of their neuroses. The government is ready to take care of all cases of mental disease developed as the result of the service, but of those discharged before seeing service it is felt that the responsibility for these men rests on their home states. This work will be valuable to the states as giving an indication of conditions which could only be obtained by a survey. The Surgeon General some time ago sent a letter to the governors of the various states asking which states would be willing to accept and care for these cases. Twenty-three replied in the affirmative; the other states did not reply or made unsatisfactory replies, as to turning them over to the chief of police, etc. An effort is being made to get these states into line so that the patients can be referred to the proper authorities and proper provisions made. This is important, as these individuals furnish material out of which many

social problems arise, and this will furnish a beginning in the way of the registration of mental defectives of the ages included in the army.

As a result of the efforts being made to keep out the cases with a tendency to shell shock, Major Salmon believes that the proportion of such cases will be smaller than in the other armies. Nevertheless, it is expected that a large number will have to be cared for. In England the shell shock cases have been brought to that country. In France they have done just the opposite—kept them close to the firing line and have treated them there. The American army will follow much the same plan. It is planned that there will be psychiatrists at the advanced medical posts where rapid and early diagnosis can be made. From these evacuation posts they will be transferred back to base hospitals, where neurologists and psychiatrists will have thirty beds for treatment. Intensive treatment will be applied at these posts and as many returned as possible. Those who cannot be treated at the base hospitals or require longer treatment will be moved further in the rear and a 500-bed base hospital for shell shock cases alone will be established. This hospital will have a personnel of experienced neurologists and psychiatrists, a corps of 65 of the best trained women mental nurses, and a group of 150 or 160 well-trained male attendants; in addition, a corps of occupational therapy workers, or, as they are called, reconstructive agents. The hospital will also have all modern equipment for treatment, hydrotherapeutic, electrical, etc. According to the present plan, all cases will be kept in France until recovered and sent back to the line. Those whom it is found do not recover will be invalided to this country, where they will be cared for in special hospitals. The present plan is that these cases shall be kept in military hospitals and under military discipline either here or abroad or until it is demonstrated that they cannot recover. It would be the height of folly if we should follow the course that has been followed by some of the other governments and turn these cases over to the civil authorities.

He emphasized the importance of the civil authorities organizing or in some way providing for those who are now being returned from the camps on account of mental disease, and also the importance of the civil communities organizing to take care of those soldiers who will go to France and return and will later suffer from so-called shell shock. This will become an important problem for the states, and in order to work it out it will be necessary to give up some of our old laws on the subject of mental disease. It will be necessary to provide treatment early rather than to wait until they are entirely broken down to such an extent that any probate court judge can see their condition. This means psychopathic hospitals, out-patient clinics, etc., to which these men can come for advice and treatment without the formality of commitments by the courts. In spite of all that can be done in the army, we shall have the problem on our hands for many, many years to come.

## DISCUSSION

Dr. Hugh T. Patrick said that the thing that impressed him about Dr. Williams's address was that we had a lot to learn. The tables shown by him were of exceeding interest. They indicated that those who are examining recruits are overlooking many cases which never should reach camp at all. From this talk we should learn four lessons: The first lesson is that we should study the figures for mental defectives. This lesson should go home to the surgeon, the internist, the eye and ear man, the throat man, the dermatologist, and the general surgeon (not alone the men who are supposed to examine for nervous and mental diseases), who should always have these questions in mind in the course of their examinations, in listening to the responses which the recruits make, in noticing how they act under the examinations, etc. He believed that in this way an idea or a suspicion might be had that there is something wrong with a man mentally and that he should be referred to a psychiatrist or to the advisory board for an opinion. The second lesson we have to learn is to have courage to reject men who are physically all right, but who are neurotics, and to accept the stigma that attaches to the rejection of a man who is physically all right, but whom it is known will not make a soldier. That is the business of the doctor and the examiner, to take the responsibility.

The third lesson is that these war neuroses are nothing new. Dr. Smith, in a little English book, has described shell shock in this way: Shell shock has brought us no new symptoms; they are the regular manifestations of hysteria, psychasthenia and neurasthenia; in other words, the well-known picture of the neuroses. Consequently they must be handled as such, not as new and mysterious. These cases must be spotted quickly and treated promptly. Paradoxical as it may seem, it takes time to develop shell shock, just as it takes time to develop a case of traumatic neurosis. This has been demonstrated. Initially, clinically, there are certain symptoms, but these cases are of slow development and remain for weeks and months in the convalescent hospital. The time to make the diagnosis and begin the treatment is at once, before the shell shock becomes a fixed psychoneurosis.

The fourth lesson is, as Dr. Williams has indicated, the keeping of these shell shock cases over there where they can be diagnosed quickly, treated promptly under the treatment adapted for them, which is not always the treatment that appeals to the laity or to the friends of the patient. It is a treatment of severity and has been best developed by Vincent, who, after these patients had been under the care of other psychiatrists and neurologists for months, would cure them in an hour and have them walking and climbing ladders. He did it by *torpejage*, torpédoing them with two things, galvanism and with his personality. He made them walk, knowing that they could walk and that they could climb ladders. This is not pleasant treatment, but it is kind treatment—it is the kind of treatment that spans the boy to make him good.

Dr. H. Douglas Singer of Hospital, Illinois, stated that Illinois is prepared to care for these cases when they come back, and asked Dr. Williams when he would receive the list of names of those discharged from the army for the reasons named. They had the machinery with which to take care of them.

It seemed to him a great deal of time and effort is being spent in avoiding sending into the army cases liable to develop shell shock, and yet the treatment recommended is that they shall be sent back to the firing line after we know they have got over it. He wondered whether if we followed that policy we should not send all cases across except those showing definite defects. If it is good treatment for one, it should be good treatment for the other.

Dr. Richard A. M. Dewey stated that he was reminded by Dr. Patrick's remarks of cases that came under his observation on the advisory board of feeble-minded individuals who presented every appearance of physical health, quite robust and well formed, who would not be suspected of being unfit for service except after a test of their reaction, their ability for mental coordination and their alertness. Many of these men have been looked upon as slackers at times, and unless one is familiar with the mental indications of feeble-mindedness or high-grade imbecility, it would be difficult to decide as to the unfitness of these individuals who would only show their incapacity when in camp or actual service. Some of them would be capable of rendering service in a modified way or within certain limits, and Dr. Dewey thought it would be possible to secure more complete service if there were some arrangement whereby a service limited to the capacity of these individuals could be arranged. The second draft gave more of an opportunity for discrimination in this respect, but he thought there still might be further lines of demarcation drawn.

Dr. Anna E. Blount asked Dr. Williams as to the relation between youth and shell shock. There are in the various armies a good many men under 21, and she asked the speaker whether the neuroses were worse in these young men or whether it made any special difference.

Dr. Albert B. Yudelson raised the point as to the large number of rejections among the southern troops; that this might be due to their lack of facilities for education and training. He said that observation in the examining room had enabled him to detect neurotic cases, such as hyperthyroidism with tremor. In case of epilepsy he required that some relative or friend of the soldier be present.

Dr. Williams, in closing, said in reply to Dr. Singer that things are now moving in relation to furnishing the names. A large number of names and addresses have had to be transcribed and the machinery has been crowded. Illinois was one of the first states to say that it was ready to take care of these returned men. These names will be furnished to the state boards where there are state boards and to those officials in the state who are responsible for these cases in the other

states. So far as he knew, the Red Cross has no official function as far as these returned men are concerned.

In reply to Dr. Blount he said he could give no definite answer, but that it depended a good deal upon the type of case. Dementia præcox cases are comparatively young; alcoholic cases are comparatively old. A man who is an alcoholic, thirty-five years or older, was a sure candidate for shell shock according to the Canadian authorities. He did not know whether that was true or not. Epileptics come at any age, as do the neuroses, although perhaps a little older than either the feeble-minded or the dementia præcox cases, owing to the fact that psychological factors are greater with older men with certain responsibilities than with younger men, although in Canada he had seen a large number of young men suffering from shell shock of neurasthenic or psychasthenic variety, usually neurasthenic.

Dr. Williams said that recently a psychiatrist had been appointed for each division hospital and would have full authority in regard to nervous and mental cases. This officer would go abroad with the forces and be in touch with the situation in regard to nervous diseases.

## THE ANNUAL MEETING, MAY 16, 1918

The President, DR. ARTHUR W. ROGERS, in the Chair

Election of officers resulted as follows: President, Dr. Hugh T. Patrick, 25 East Washington Street, Chicago; Vice-President, Dr. Herman Campbell Stevens, 25 East Washington Street, Chicago; Secretary-Treasurer, Dr. Samuel N. Clark, 1812 West Polk Street, Chicago; Councilor, Dr. Arthur W. Rogers, Oconomowoc, Wisconsin.

## EXPERIMENTAL STUDIES OF THE OPTIC THALMUS

Dr. F. T. Rogers, Department of Physiology, University of Chicago (by invitation), read this paper (published in this number of the *JOURNAL*, p. 1), illustrated by lantern slides.

*Discussion.*—Dr. Meyer Solomon asked if Dr. Rogers had come to any conclusion regarding the rôle of the optic thalamus in relation to emotional reactions. He thought those who were in the habit of viewing the nervous system from the evolutionary standpoint would be interested in this side of the question. Highest phylogenetically we have the function of critical consciousness. Next below in order is what he would call "observing consciousness." Below that came ideation, then the emotional reactions below that, and then the locomotor reactions—meaning the spontaneous movements of walking and the like, and also the attitudinal or postural reactions or the ability of the individual to hold his place in space. Still lower down we find the vegetative functions; and, finally, physico-chemical reactions. In functional disorders



there was an upset somewhere along the line at one level or another or several combined. Dr. Solomon was interested to see if work on localization of the kind presented by Dr. Rogers could be applied to "shell shock," so-called. The thought had come to his mind as he listened to Dr. Rogers' presentation that in the so-called "shell shock" cases of functional type there was nothing more than fatigue or dissociation here and there in the centers, this bringing about a condition closely resembling experimental ablation of different centers. He ventured the opinion that in the so-called "shell shock" cases in actual life there were reactions due to partial destructions of a temporary nature, and he thought that in a clinical way the application of what he had heard from Dr. Rogers might be applied in that direction. There apparently was much the same effect in regard to hunger reactions when the optic thalamus was injured, as occurred in neuropathic individuals who were uneasy and upset from any cause whatsoever,—such as over-eating, overwork and anger, restlessness and spontaneous movements resulting. It was a question whether straight out and out clinical observation did not give findings somewhat similar to the results reported by Dr. Rogers, the results being due to fatigue and partial disintegration of some of the same centers which Dr. Rogers experimentally injured in his work.

Dr. Harold N. Moyer thought the experimental work on the pigeon threw some light on the condition of the moron; they could beget children but could not take care of them. Most interesting was the reaction of the pigeons to temperature; with so many confusing factors in experimental work it would be easy to miss such a reaction.

Dr. F. T. Rogers, in closing, said he thought it was doubtful if physiology would ever be able to answer the questions concerning the rôle of the optic thalamus to the emotional reactions. The only thing that could be done was to judge by behavior, and he knew of no method whereby this could be translated into terms of feeling. Whenever the optic lobes or red nucleus were involved the animals were paralyzed.

The reaction to temperature had been the most striking thing to him. It was interesting to know that men had worked for a hundred years and never noticed the influence of temperature on reflexes in the decerebrate animal. As soon as the body temperature went down to 34° C. the nystagmoid movements disappeared. He did not know why, but a lesion in the thalamic part of the brain did abolish the temperature controlling mechanism of the bird.

He could not say what centers were destroyed, at autopsy, except that everything anterior to the optic thalamus was removed or greatly damaged.

## BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

MEETING OF APRIL 18, 1918

DR. CHARLES G. DEWEY, President, in the Chair

SOME TESTS INVOLVING CHOICE, SHOWING PERSONALITY  
TRENDS AND A SENSE OF HUMOR

Dr. A. Myerson presented a short paper on a group of tests involving choice of course of conduct and revealing attitude of mind toward hypothetical situations and problems. He said that the usual psychological tests of choice involved selection of good or bad, correct or wrong alternatives. His set of tests, however, involve differing lines of philosophical response to questions. The tests comprise a series of assumptions which the individual tested is asked to complete from several phrases, each of which makes sense with the assumption and completes the idea contained therein.

Of these tests, Dr. Myerson has two sets, a group of ethical questions and a group of humor tests. In the former, the philosophical trend of thought is brought out, as evidenced by the responses selected, and among the psychotic, the test has on various occasions opened spontaneously the entire field of delusions, especially in delusions of a paranoid character. After choices are made, the examiner proposes completions of the original assumptions other than those selected by the examining individual, asking whether the tested individual accepts or rejects the new idea. He is then asked to complete the balance of the assumptions with similar ideas, *i. e.*, testing ability to follow an alien point of view and to maintain an order of merits. Occasionally this method has obtained the first leads of an underlying conflict.

The humor tests are much the same, with logical answers to questions, arranged in order of degree of humor from sarcasm, stale jokes, to true wit, the selection of which gives some idea of the ability of the individual to construct humor.

THE ACTIVITIES OF THE WAR WORK COMMITTEE OF THE  
NATIONAL SOCIETY FOR MENTAL HYGIENE

Dr. E. E. Southard was absent from the meeting and the Secretary of the Society read a few notes from him on these activities, in which he outlined the early organization of the War Work Committee by Dr., now Lieut.-Col., Bailey and Dr., now Maj., Salmon, aiming at both unity of action and speed in the mobilization of the neuro-psychiatric and psychological resources of the country. He mentioned the work of the psy-



chologists at the cantonments in the examination of the soldiers and officers and in the testing for defectives, and also the work of the neuropsychiatric units in the army. The results of the examinations of the latter group had resulted by January, 1918, in the elimination of 8,000 men from active military duty as misfits. Dr. Southard emphasized the fact that this country is the first to attempt elimination of nervously unfit from the army activities by examinations for evidences of such inadequacy. He spoke of the great need for men trained in this field, noting that over 300 men had already been commissioned in the army for this work. New York and Massachusetts leading all other states in the number, proportionate and absolute, of men to enlist from the state institutions. He said that there was also a great need of male nurses for the work, reconstruction aides, social service workers, a necessity for provisions for the care of the families of men entering the service, and similar problems to which the War Work Committee is now devoting its energy and time.

#### DISCUSSION OF DR. SOUTHARD'S PAPER

Dr. William McDonald spoke of some of the difficulties he had had in dealing with this committee, demonstrating that it was clearly very much overworked. He then showed the X-ray picture of the badly smashed lumbar spine of a Canadian soldier who has been wounded by shrapnel at Ypres, and upon whom several operations had been performed. This man is still on active military duty (clerical) in Canada, despite the complete loss of function of both legs.

#### THE PROGRESS AND PLANS OF THE MASSACHUSETTS SOCIETY FOR MENTAL HYGIENE

Dr. Henry R. Stedman spoke of the inception and early organization of the Society about three years ago and the early difficulties which the Society had encountered,—the difficulty of securing recognition, and funds, criticisms of the movement, predictions of failure, etc. The work of the three years has borne fruit, however, and similar branch Societies have been organized in twenty other states. There has also been an ever-increasing public interest shown in the activities of the Society which promise to develop into an important factor for constructive work along the lines of education regarding mental disease and its prevention.

He spoke of the various methods used by the different state organizations in carrying out their plans, some relying largely upon clinics and exhibits, some upon legislative means and others upon social service work. The plan followed in this state is one of a campaign of education. He listed the very considerable amount and variety of literature by well known authorities on such matters which had been requested by and delivered to many of the institutions of higher learning and school organizations in this and other states. He spoke also of the great inter-

est shown by the public, educators and profession in the various lectures and annual conferences of the movement, which is rapidly increasing.

Dr. Stedman then outlined briefly the plans of the Society. Of first importance is special mental hygiene work in relation to the army service and with the men rejected and those to be returned later suffering from various affections of the nervous system. He said that the work had already begun and a certain amount of literature had been distributed to the camps and men bearing on the nature and prevention of nervous conditions.

Another field of work to be further developed is the intensive study of, and assistance in the forwarding of, plans for special work in training the backward children of the schools, in coöperation with the school authorities and teachers. The necessity for proper recognition and instruction in mental hygiene in medical, normal and kindergarten schools was emphasized. He called attention to the fact that the institutions of higher learning were giving more attention to the problems and instruction of mental hygiene than the medical schools, a fact which he deplored. Another type of work which is being carried on is the constructive campaign for the care of defective delinquents. The nature of this immense social problem is not appreciated even by the medical profession. He spoke of the bill in the legislature providing for the care of these individuals in institutions other than those for the feeble-minded and insane, in neither of which they belong. Finally an intensive study of a few limited districts in the state is being undertaken, hoping by such a plan to secure concrete leads as to the possibilities of wider intensive work.

#### BOSTON METHOD OF MEETING THE NEEDS OF THE EXCEPTIONAL CHILD BY SPECIAL CLASSES

Dr. Arthur C. Jelly opened his paper by a discussion of the early organization and development of the program of using special classes for exceptional children as worked out in the Boston schools since 1902. He said that at present there are 70 classes with an enrollment of 1,000 pupils. There are several "centers" of these classes, that in Roxbury comprising eight classes for boys, the one in the West End containing six classes for boys and the one in the South End for girls comprises six classes.

The purposes of the special classes are to relieve the teachers in the regular grades from the necessity of giving extra time and attention to the backward children at the expense of the others, the removal of sources of annoyance and disturbance in the class rooms, as the pupils for the special classes frequently prove to be, and to give to the backward child the optimum of time and attention to develop to a maximum his limited faculties and abilities.

When it is decided that, because of the number of backward children,

a special class shall be organized in a given district, each teacher in the district is asked to report on furnished blanks the names, ages and school records of the backward children under her supervision. Formerly a circular was sent to each teacher telling what to look for as early evidences of mental inadequacy but lately this procedure has been discontinued because deemed unnecessary by the school authorities. For the past six years, Dr. Jelly has followed the plan of giving talks to the teachers on matters related to mental disease and feeble-mindedness and once a year takes up similar matters with the regular school physicians and nurses.

The aim is made to secure the children under ten years of age for, by the time a child is over that age, the amenability to treatment is much diminished, while at the younger ages, the possibility of character rectitude is much greater. Psychological tests and necessary mental examinations are made on the children recommended for admission to the special classes by the respective teachers. In the instances of low grade feeble-mindedness, recommendation is made to the parents that application for admission to one of the state schools be made, which action follows in about 50 per cent. of the cases. The imbeciles interfere with the regular work of the special classes and it is not always desirable to take them into the classes.

Dr. Jelly spoke of the law requiring all children to attend school up to a certain age which he contrasted with the regulations in Great Britain where provision is made for a Government Commission to decide points of difficulty between parents and teachers in such matters. He called attention to the fact that there are a number of imbeciles in the ungraded classes and many of them should be in state institutions. These pupils are frequently demoralizing factors in the special classes and when they do become too troublesome, they are recommended for care in the state schools.

The reader spoke in detail of several cases he had encountered to illustrate the occasional lack of coöperation between the school authorities and parents in carrying out the program of the special classes. The divergence of opinion is occasionally a distinct hindrance to the success of the plan.

Dr. Jelly then discussed the various psychological tests used in the determination of the mental status of the pupils, mostly amplifications and modifications of the Binet-Simon tests. He spoke of the objections to these tests,—the language difficulties both in understanding and answering the questions, the difficulty some children have in understanding the question as it is worded, the inapplicability of the tests to children suffering from such defects as blindness, deafness, speech disorders and the like. He mentioned the value of the performance tests as supplements to the regular tests and said that every possible test was applied to ascertain as accurately as practical the intelligence of each child examined and their ability to adjust themselves to new sets of circumstances. He

spoke of the need of securing a set of tests which will give the desired information in less time than the present methods of examination allow.

The excellent working of these special classes during the last six years is due largely to the hearty encouragement and endorsement of Dr. Dyer, Superintendent of Schools, who had previously been interested in similar work in Cincinnati. For further efficiency, the various classes are separated into groups according to the aptitudes and choice of the children, some doing hand work, some manual training, etc., aimed at giving the child an ability to do useful things and to inculcate proper conduct. A plan has been followed in the last few years of taking groups of about fifteen boys for four days each week to work on a farm, alternating groups each week. The acquisition of first hand knowledge of gardening and other farm work, the associations with animal and country life, the arousing of self respect by the responsibility of their own garden plots, the increase in vocabulary and the development of individuality have made the plan a very successful one. It is abandoned this year because of a lack of funds.

A supervisor of special classes was designated in 1912 and that feature of the school work is much better handled now than formerly, when it was a part of the work of an assistant superintendent. Weekly Friday conferences are held by teachers of the special classes at which notes are compared, ideas exchanged and the coöperation of the various class teachers better secured. A follow-up system has been inaugurated whereby graduates of the special classes (at sixteen years of age) are followed in their subsequent employment and activities. An employment bureau seeks to secure positions for the pupils as they finish the special classes.

In closing the paper, Dr. Jelly said that the plan of the special classes was used not only for the intellectually inferior pupils but that much success had been attained in the development of character deviates, in cases of obstinacy and among the neurotic children, all of whom were much better off in the special classes where each child becomes a special study.

#### DISCUSSION OF DR. JELLY'S PAPER

Dr. Walter Fernald mentioned that the Boston classes for special pupils were among the first in the country and had been originally modelled after those established in France, Germany and England. It was first considered a radical measure of treatment of the problem of the backward child, most American authorities feeling that the state institutions were the places for them. Dr. Fernald spoke of the great economic saving to the state by the plan of special classes, saying that the 1,000 children so cared for in Boston would cost \$1,000,000 for housing alone if cared for in an institution and that the maintenance would cost \$200,000 a year. He said that the plan was also an educational

means of bringing recognition of the problem of the mentally defective to the parents of the child, the public, the police, clergy, medical profession and social workers, and a realization in the minds of these people of the limitations and liabilities of these defectives. The follow-up work was highly commended and largely instrumental in contraverting the idea that the fate of most feeble-mindedness is prostitution and crime, asserting that there are good as well as bad feeble-minded individuals. Dr. Fernald mentioned also that the state institutions for the feeble-minded now perform the function that a few years ago was relegated to the reformatories. He said that the special classes serve as clearing houses and that about half of the cities of the state now have special class organizations.

Dr. Fernald commented about the criticism which Dr. McDonald had made about the inefficiency of the way correspondence had been handled by the National Committee by merely calling attention to the tremendous amount of work which had devolved upon the organization, all of which had to be handled by an entirely inadequate clerical staff. He felt sure that the difficulty was entirely one of not being able to keep up with the correspondence as it pours into the Home Office.

Dr. Nute spoke of the problem of psychological examination of the incoming immigrant and the paucity of standardized material on this phase of the work, illustrating the difficulty by a number of cases, such as deaf mutes without any language, peasants who frequently test decidedly below normal levels but who have made a success of life in this country. He spoke of the difficulty of getting the public, courts, and even the profession to understand just what is meant by "feeble-mindedness." When Congress debarred from landing in the United States all feeble-minded persons it did not undertake to define the term but probably assumed that there was a general legally adopted definition. The definition used by the Immigration Service is that found in the regulations of medical inspection of immigrants issued by the U. S. Public Health Service.

Dr. Jelly closed the discussion by saying that the work in the Boston program of special class work was a monument to Dr. Walter E. Fernald. When asked whether physical defects such as poor eyesight, deafness, adenoids and intestinal disturbances played any great part in the cases as they presented themselves in the special classes. Dr. Jelly said that it was his impression that they did not have much to do with the mental status, though attempt should always be made to correct physical difficulties as far as possible in order to remove every possible handicap to efficient mental and nervous functioning.

## Critical Digest and Review

### WAR NEUROSES AND PSYCHONEUROSES

BY DRS. CHARLES ROCKWELL PAYNE AND SMITH ELY JELLIFFE

*(Continued from Volume 48, page 394)*

While discussing these preliminary symptoms of anxiety as particularly revealed by the disturbed and restless nights, the perplexing, impotent, and nightmarish experiences of the night life, it may be worth while calling attention to the fact that since the war's onset a great many observers have made many important findings contributing to an accumulating mass of evidence along these lines which heretofore has been largely pooh poohed by the conservative neurologists both here and in Europe. It will be impossible here to adequately discuss or give credit to this wealth of material, but while on the subject certain connections may be emphasized where the war neurotic or psychotic beginning with the restless night life evidences various grades of disturbed dream states of diagnostic importance.

The experiences of the Russian psychiatrists already spoken of have dovetailed with the observations of other authors who have observed the dreamy deliria and hallucinatory confusions of volcano and earthquake traumata, and also the affective traumata resulting from explosions on board men of war and of submarines.

Even in the civilian population the restlessness and insomnia in war times has attracted the attention of psychiatrists, among whom Redlich has made some interesting comments. Speaking of conditions in Germany,<sup>5</sup> Redlich says that insomnia, especially among peasants, who had never before known anything of sleeplessness, was very frequent. Dreams about war scenes seemed to disturb their sleep. He also makes the note that variation in body temperature and modifications in the heart action without apparent adequate cause were extremely frequent.

Régis in a number of articles has taken the opportunity to emphasize this aspect of the symptomatology. Inasmuch as he has

<sup>5</sup>Redlich, E., *Med. Klin.*, 11, April 25, 1915, p. 469.



written of these subjects for years, he is in a position to express an expert opinion. More particularly in one of his reports made in the early part of the war for his neurological center<sup>6</sup> he says that hallucinatory dream states were practically universal in all of the patients observed by him. While speaking of the more severely ill he also adds that there are very few wounded returning from battle who do not dream of fighting. These dreams of fighting have a tendency to become less and less frequent but practically all returning soldiers give this experience.

Little by little, this essentially average process, and hence called normal, in certain of the soldiers begins to take on a pathological character. Régis speaks of these as morbid dream states. When the dream commences to be lived out in reality then its pathological character begins to be recognized. In the article in question Régis speaks of the phenomenon as *hallucinatory oneirism*. This has been universally found in all of his patients having war neuroses. The events and incidents of the battle which serve as its theme are variable. There is the bursting of shells, the shrapnel, the fusillades, the planes, the charges, the life in the trenches, the spectacles of the wounded and the dead. For the most part the scenes are multiple, making a veritable phantasmagoria. At times there is a stereotypy of expression of the dreamy state. The patient painfully lives over a scene again and again; a type of experience with which psychopathology has long been familiar in the civil practise of the traumatic neuroses. The degree of this hallucinatory oneirism varies considerably in different patients and it may be at different times with a single patient. Sometimes the visions are simple and transitory. Sometimes the sleeper is seized to such a degree that he lives the whole thing in his sleep and even walks in his sleep or carries out the acts of the waking life which surrounded the incidents. He may carry the matter into the waking life, thus giving rise to another type of behavior which shall be considered later that of mental confusion. The various types of conduct may be better imagined than described, the variations being so many and manifold—waving arms, gesticulating, fighting, shuddering, crying, begging, praying. Our current literary output in the weekly magazines is essentially built up of these types of activities.

Speaking of the intensity of these dream experiences and attempting to correlate them with the later developing symptoms, Régis says that if the intensity of this hallucinatory oneirism marks the profound influence of the emotions of a battle on soldiers, it

<sup>6</sup> Translated in Bost. Med. Surg. Jour., Nov. 30, 1916.



contributes for its own part by a sort of delayed shock to maintain in a high degree the impressionability of its subjects. We feel that in this respect Régis has put his cart before the horse. Students of the dream phenomena have of late emphasized the essentially dynamic character of the dream process. The dream has an enormously important discharge function. It seeks, so the more careful studies show, to establish compensatory relations in the autonomic activities of the bodily organs. If it were not for the symbolic energy discharges which the dream is able to carry out the autonomic visceral activities would be more seriously interfered with and organic visceral changes would be more likely to be induced. These metabolic changes are of course in evidence most of the time, but if the dream work is successful, they are reduced to a minimum. In fact Régis has noted a certain correlation between the dream activities and the urine-secreting function of the kidney, although he has not altogether grasped the inner dynamic significance of the dream process as prophylactic and reparatory. Thus he says that while the circumstances have been too difficult to carry on careful examinations yet he has noted that there is a definite relationship between the urine curve and the dream curve. There is a tendency for great suppression of urine at the height of the dream curve. In the language of modern psychopathology this would be the equivalent of saying that the organism is attempting to establish a balance by means of the affective discharge through the dream process. Failure would result in a total shut down of the kidney function and then the amount of functional loss in the kidney could be used as a register of the depth of the emotional distress [fear] and the attempt on the part of the dream mechanism to relieve the autonomic regulations which have been disturbed by the fear reaction. Although Régis does not stress the function of the oneiric delirium in this light its compensatory character is made manifest nevertheless by his attendant observations. For he does state, in attempting to show that alcoholism has nothing to do with the phenomena he is considering, that the *emotional stimulus may act precisely like an intoxicant or an infection*. He thus is coming to sustain a psychopathological viewpoint so well elaborated by Kempf in his recent study of the Autonomic Regulators of the Personality<sup>6a</sup> that the emotions have a peripheral origin in the pleasure pain stimuli and bring about more or less fixed tropistic reactions, analogous to postural tonus in the viscera as a result of destructive stimuli [painful emotions].

<sup>6a</sup> Nervous and Mental Disease Monograph Series No. 28.

We have called attention to the dream disturbances first because of a personal general belief that affective compensations through symbolic (psychical) activities are paramount and that the symptoms in the physical machine are indices of varying degrees of faulty affective satisfaction. Many of these autonomic disturbances are to be found in the literature, chiefly under different rubrics, because of the general failure to take in the situation in its broadest aspects. When all of the material shall have been brought together a comprehensive series of correlations may be made. Until that time comes however one will be compelled to simply record the disparate fragments of observation and hope for a later opportunity to weave them into some philosophical unity. These premonitory disturbances which bear on possible shell shock have been described under a host of titles. Hyperthyroidisms, neurocirculatory asthenias, functional disturbances of the skin, of the liver and kidneys,<sup>7</sup> hypoadrenalemias with myasthenias and fatigue states, increases in epileptic phenomena, etc. We shall direct attention to certain of these.

One that immediately attracted attention as soon as mobilization took place and which received study in European countries as well as in the United States, was the sudden access of mild states of *hyperthyroidism*.<sup>8</sup> Stated in different ways by different authors there was, from the psychopathologist's point of view, an almost amusing surprise that such a reasonable thing should need emphasis. No one stated the situation more naïvely than that excellent internist Harlow Brooks who said that one of the greatest medical

<sup>7</sup> See Régis, urinary curve observations, etc.

<sup>8</sup> Harlow Brooks. Hyperthyroidism in the Recruit. N. Y. Acad. Med., Feb. 7, 1918; J. N. & M. D., —; Am. J. Med. Sc., Nov., 1918.

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Rathery, F. Bull. Acad. de Med., 1917, 3 s., 78, 356. Paris Med., 1917, 20, 312.

Ruediger. Münch. med. Woch., 1915, 62, 533.

surprises to which he had been treated since on active service has been the large number of cases of hyperthyroidism, which in civil life he thought almost entirely a disease of women, particularly those very easily influenced in their youth. He lay no claim to having made a discovery in bringing this type of case to attention, for the British have described the same condition as the effort syndrome, or as "D. A. H."—discovered action of the heart. This group of circulatory phenomena Brooks says is an inseparable part of the condition known as shell-shock, which occurs in many people who have never heard the sound of a shell, and particularly among those who earnestly hope never to do so. The most striking feature of nearly every case is a very persistent rapid action of the heart, this being the symptom which brings the patient to the regimental officer. This symptom is the same in recruits presenting themselves for examination as in those who report later, after army life may have upset their circulatory equilibrium still further. The tachycardia is very seldom accompanied by arrhythmia; the rate is usually increased by exercise, although in a few cases it may be slowed by exercise, especially when the attention is distracted. Throbbing of the superficial vessels, particularly the carotids, brachials, and even the femorals are symptoms also observed; in thin people that of the aorta is evident. The polygram would indicate the difference between this condition and aortic incompetence.

It is hard to analyze the heart sounds, though in some cases there is a soft systolic murmur at the apex, transferred at times with less intensity toward the axilla. There are symptoms which are not as important as the tachycardia. The capillary return is slow, and a capillary pulse is simulated. Patients often complain of severe pain in the region of the heart, and it is often possible to indicate areas of very great sensibility to touch or pain. Rapid flushing and paling, fainting and dizziness are also symptoms. Except in oversensitive patients, the blood pressure is very low. The symptoms are increased by epinephrin, and there seems to be over-sensibility to thyroid. The nitrites also make the symptoms more pronounced, and there is over-sensibility to vasomotor dilators. Digitalis can not control the tachycardia. The bromids give much relief in some cases, but seem to have no effect in others. Emotional instability usually accompanies this disease, and is second in importance to the tachycardia. This symptom is shown by epileptoid attacks, outbursts of passion, tears, profanity, and sometimes convulsive muscular spasms. A stage of great exhaustion follows such emotional outbursts, in fact the state of exhaustion may be so great as to make

the patient appear to be dying. [Adrenalin exhaustion from affective implications.<sup>9</sup>]

Instability of the vessels of the brain may be further indicated by *tache cerebrale*, *dermographia*, *urticarial* rashes, and the symptom of tremor which is almost constant.

Brooks then attempts some ethnic generalizations, which are needless to say purely gratuitous and highly conventional, but as giving certain figures are recorded. A very certain indication of the strong emotional element in the disease is furnished by the types of nationalists which are affected. He says that 50 per cent. of the cases which have come under his observation are Jews, the Italians are next in order, then the Irish, and last of all, the negroes, where there was found to be only one case, and that one doubtful, from among about 5,000 recruits. Most of the patients are above the average mentally, and it is to be regretted that the condition is very often found among the most promising non-commissioned officers.

There is a definite overgrowth of the thyroid in about two thirds of these cases, or it is at least prominent. The part that heredity plays in the syndrome has a direct bearing on the question of the part played by hyperthyroidism in this condition.

The affect of emotional shock, fright or mental injury, on exophthalmic goiter is too well known to cause any doubt, and it explains why there are so many of these cases among young men of draft age. So far there has been a question as to whether these patients would make good soldiers. Many of the patients get well under the healthy and normal camp life. If in these cases there should be careful training, not too severe until the recruit is stronger and capable of heavier work; if there is something to relieve the worry and strain, such as games, camp shows, etc., these men, who often have the finest patriotic and spiritual strength, are certain to make good soldiers; but if they are not happy, or if their strength should be overtaxed by heavy work, the recruit may break nervously, or incompetence of the heart may finally develop.<sup>10</sup>

Aubertin,<sup>11</sup> in speaking of many types of tachycardia, many of which have no relation whatever to the problem under consideration, discusses the hyperthyroid type, making it fairly clear that it is

<sup>9</sup> Loeper et Oppenheim. *Les glandes surrenales en pathologie de guerre*. Rev. gen. de path. de guerre, 1916, I, 123.

Sergent, E. *Bull. Acad. de méd. Par.*, 1915, 35, 74, 268.

Kohnstamm, O. *Therapie der Gegenwart*, 1915, 56, p. 328.

<sup>10</sup> Gallarwardin. *Névroses tachycardiques et maladie de Basedow fruste*. Arch. d. mal. s. Coeur, Feb., 1916, p. 45.

<sup>11</sup> Aubertin, C. *Les tachycardies de guerre*. La Presse Méd., Jan. 24, 1918.

difficult to draw the line when a tachycardia is exophthalmic or when not. These types of tachycardia are characterized by their persistence, 120-130 standing, 90-100 lying, but irreducible by rest, regime, diet, digitilis or salicylates. Muscular effort shoots the pulse rate to 150-160 with a drop in the rest period, the tension is raised in 80 per cent., and like the tachycardia is not reducible by the rest period. Furthermore, the affective situation (neurotic-psychic-emotional) is portrayed in other symptoms of the fear reaction—unconscious.

It is not our purpose to discuss these tachycardias en masse. The variations in etiology on morphological foundations are infinite, but we do desire to call attention to the fact that, inefficient affective compensations, failing in the behavior discharges in the individual, then further inadequately resolved by the symbolic activities of the night life, bring about forced autonomic responses in various of the visceral activities. In the compensatory interplay between different protective devices, certain individuals show up inferior organs, here or there. The hyperthyroid response to fear is very prompt and striking—what the complicated interplay between iodine need discharge—through sweat, skin, etc., may be is still an unsolved problem in physicochemical dynamics, but at all events, and the point to be emphasized is that specific types of emotional or affective conflicts demand or are being met autonomically by specific chemical (metabolic) activities of which the hyperthyroidism, with or without macroscopic glandular hypertrophy, is but one index of faultily handled complexes in the Freudian sense. Personal studies of psychoneuratics by one of us [J.] tend to emphasize the unconscious economic-money conflicts as lying behind the fear reactions which call especially upon the thyroid for their compensatory activities. This idea was advanced as a suggestion some years ago, at the American Neurological Association in a study of hyperthyroid and hypothyroid states and their psychical connotations, particularly in the prostitution complex of younger woman in its relation to the hyperthyroid response, and the mother-son situation in hypothyroid states in elder women. The personal studies referred to, comprising now some dozen or more hyperthyroid states in soldiers, have all shown that the money conflicts have occupied an unusually large rôle in the patient's conscious and unconscious activities.

Many recent studies have emphasized the emotional viewpoint, but none with such insight as Macfie Campbell in a recent discussion on the Rôle of the Instinct, Emotions and Personality in Disorders

of the Heart which prompts us to present it<sup>12</sup> rather fully in this place.

"In internal medicine," Campbell writes, "intensive study is devoted to the individual organ of system; it is frequently necessary to pay attention to the way in which the organs are linked together by the central nervous system or by the glands regulating the biochemistry of the body, but no higher integration is attempted."<sup>13</sup> The actual individual is seldom reconstructed for the purposes of the internist; personality is a category that he does not use.<sup>14</sup> So far as the study of personal factors is omitted, the study of the functions of the individual organs is incomplete. Not only does each organ have its definite routine task in relation to the domestic economy; it is also liable at any time to be commandeered for foreign service, when the individual has to react to an external situation of biologic importance. The individual reacts to such a situation in virtue of his innate instinctive equipment, and each instinctive reaction make its special demand on the various organs. What from the outside is an instinctive reaction may on the inside appear as an emotional experience; the instinctive flight or hiding from danger is at the same time registered as the emotion of fear. One instinct may conflict with another instinct; one instinctive reaction may be inhibited by another, or by factors more complex than instinct, for not all behavior is instinctive. Tradition or training may check the instinctive tendency to flight.

That part of the instinctive reaction which is inhibited or modified by other processes associated with memories, purpose, ideals, etc., may not manifest itself, but these movements are only the more obvious expression of the instinctive reaction; simultaneously with the movements of flight, actual or inhibited, the whole system is mobilized in the interests of the safety of the individual. Cannon has published interesting detailed studies on the physiology of this mobilization. We may check our tendency to flee, but against our wishes our heart beats wildly, our respiration is modified, our tongue cleaves to the roof of our mouth, our knees knock together and barely support us, and we break out into a cold sweat.

*(To be continued)*

<sup>12</sup> J. A. M. A., Nov. 16, 1918.

<sup>13</sup> See Introduction to Jelliffe and White, *Diseases of the Nervous System*, 2d edit., 1917.

<sup>14</sup> Ibid. Introduction to Part III, *Symbolic Neurology*.



## Current Literature

### I. VEGETATIVE NEUROLOGY

#### 1. VEGETATIVE NERVOUS SYSTEM.

**Egger, M.** THE STATIC TONE AND ITS RÔLE IN NERVOUS PATHOLOGY.

[Schweiz. Arch. f. Neur. u. Psych., Vol. I, No. 1, 1917.]

Egger attempts by these studies upon tonus to obtain light upon the slipping of the knee in tabes. He believes this cannot be due, as has been supposed, to the fact that conscious sensibility of the knee has been lost, because slipping is observed in a number of ataxics where such sensibility is intact. But in the thalamic syndrome where it is completely abolished, neither ataxia nor the slipping exist. Incoördination is evident at the attempted voluntary movements but while walking no ataxia is evident. Neither can the Charcot-Leyden theory that conscious sensibility directs the movement be held, since that follows rather than precedes the movement. Therefore an attempt is made to find some explanation in peripheral phenomena. In the erect position the musculature is more active than in the recumbent position. There is a peri-articular muscular contraction which prevents our falling as certain tabetics and cerebellar cases do. Certain experiments with the subject in various positions show that the increase of tonus of certain of the muscles of the erect subject permits of less ample excursions. Furthermore the muscle-joint sensibility is the factor which directs the centers to the various positions, for in spite of absence of vision or of orientation the tonus persists. Further simple experimentation reveals the fact that it is this muscle-joint sensibility which stimulates the increase of tonus. Traversing a soft or even terrain after climbing makes it difficult to prevent the failure of the knee or the turning of the foot, but tonus is restored and position controlled when one begins to remount. Not only articular pressure but the extension of the muscles plays an important part. The fibers are then very easily excited and contraction is stimulated, which principle is well utilized by nature. Egger believes that the motor mechanism for walking is not situated in the cortex. Only the incitation for the beginning of the action starts from there, but the development of the dynamic motor formula falls upon the cerebellum and at the tegmentum of the mid-brain where the excitants of the tonus reflex arrive. He then proceeds to prove that two excitants of different natures, such as an extension provoked in the muscle and the volitional incitation. This, through the position of muscles and joints which it



instigates, tends to diminish the tension, but the latter is increased in turn by the articular pressure. This shows how two excitants of a diverse nature compensate each other and produce the one result, the tonicity of a dynamic muscle. The same principle is manifested in a person in the squatting position, or raising himself from it and in walking. In the latter the author explains at length the working of the different factors of the process. Walking thus appears to be a mechanism of autoregulation comparable to respiration, which is under control of the vagus. The writer cites at length several cases which confirm these conclusions. They were patients who, because of infantile paralysis or other lesions, manifested varying degrees of motor difficulty, some very severe. In all there was an element of surprise to the physicians in the unexpected movements or complicated set of movements they were able to perform. These showed themselves dependent upon the principle of autoregulation and pressure stimulus which the author has described.

In cerebral hemiplegia the static tonus seems to be always preserved. One patient with an unusually complete hemiplegia was yet able by altering his position to use the affected limb to some extent in the movements of walking through the principles stated. With subjects apparently incapable of the smallest degree of flexion, in an upright position they can raise themselves upon the extremity of the feet and the tibial tarsal articulation again proves itself possible and an often considerable excursion is made. It is usually only with the sound foot that the first position is assumed, the action of the static tonus is however responsible for the movement secured and its action is bilateral upon the soleus of the paralyzed leg.

The conclusions which the writer reaches from this study are:

1. The upright position differs from the recumbent by an increase of tonus in the musculature.
2. The tonicized muscle produces a less ample excursion but a greater force.
3. The static tonus is regulated by articular pressure and the extension of the muscle.
4. The two inciting agents, even if they act only on one side, produce a homologous and bilateral tonicity.
5. Two energy factors have part in this attempt, the volitional and the reflex.
6. In the mechanism of the lower limbs the reflex energy preponderates over the volitional.
7. The dynamo-motor effort of walking seems to be regulated by the two excitants of tonus, muscular extension and articular pressure.

What may be drawn from a study of the upper limbs is left for a further report.

Fletcher, W. M., Hopkins, F. G. RESPIRATORY PROCESS IN MUSCLE AND THE NATURE OF MUSCULAR MOTION. [Proc. Roy. Soc. Biol. Sci., Series B, Vol. 89, No. B, 619.]

The authors review the importance of muscular activity as the means of knowing the modes of energy discharge by the living cell and the relation of these to the specific chemical processes of life.

It was held at the end of the last century that muscular energy sprang from a more or less explosive breakdown of a molecular complex which had been made "irritable" by the inclusion of oxygen in the cell while at rest, lactic acid and carbon dioxid being liberated. The idea that this irritability was dependent upon combustion was disproved, since it was found that carbon dioxid took place in the temporary absence of oxygen, lactic acid being also produced. This led Hermann to assume the existence of "inogen" as an unstable precursor in which the necessary combustion took place to yield the energy of contraction, and that fresh carbon bodies and perhaps lactic acid entered into a newly oxygenated molecule of inogen. This inogen theory, extended to the so-called anabolism and catabolism in the chemical processes of life in all cells, rested on two bases. (1) It was believed that the oxygen was already present and therefore combustion could take place with a simultaneous fresh production of lactic acid and carbon dioxid in the absence of an immediate oxygen supply. (2) The increase in the instability of the inogen molecule and in the rate of production of the lactic acid and carbon dioxid with rise of temperature was recognized, as well as the fixation of the molecule without yielding either substance if the muscle were scalded suddenly with hot water. Later experiments of the authors with advance in technic prove however that the contemporary and immediate supply of oxygen does affect the products due to contraction and that the hypothesis of a previous inclusion of oxygen is insufficient. In regard to the second basis of Hermann's theory it was found that rapidly scalded muscle yields a large volume of carbon dioxid but practically no lactic acid. The carbon dioxid yield is also from two sources, one displaceable by acid, the other by heat. Lactic acid and carbon are therefore separately expelled.

It was found furthermore that the carbon dioxid yield is much increased in the presence of oxygen and yet the irritability is not more quickly exhausted but longer maintained. All irritant gases quicken the production of lactic acid, which in turn expels preformed carbon dioxid. At the same time lactic acid is the most obvious cause of fatigue and stiffening of muscle, yet these two conditions are inhibited by oxygen. Qualitative estimations made under conditions which eliminated disturbing influences showed that fatigued muscle contained more lactic acid than resting muscle but less after resting in an oxygen atmosphere. Lactic acid was found to increase after mechanical injury, and the output of undamaged muscle increases in increase of temperature under

conditions where the discharge had been spontaneous, while in oxygen there is no evidence of such output. Instead there is a decrease of lactic acid when fatigued muscle containing lactic acid is left at rest in an oxygen atmosphere. Marked rise of temperature overcomes this effect of oxygen, and so does severe mechanical injury. It is plain then that oxygen enters the muscle substance for the purposes of an immediate combustion and not to prepare material for explosion. Experiments upon heat production in muscle show that the oxidations which are always associated with muscular activity are separated in time from the moment of liberation of mechanical energy. They have to do with a restoration process, not with stimulation. Lactic acid instead of being regarded as a toxic product is probably an essential agent in the machinery of contraction itself. The muscle fiber itself seems to yield lactic acid by a non-oxidative molecular rupture, heat being given off. The accumulation of the acid produces fatigue, but the presence of oxygen removes this after each contraction and each successive stimulus with its associated breakdown is followed by a normal contraction. Successive experiments lead to the belief that it is the lactic acid itself which is not removed by the oxygen but is oxidized again into the muscle with a yield of carbon dioxide and that at least part of the heat of lactic acid combustion is stored in potential form in the muscle as it returns to rest. The potential energy required for the act of contraction probably lies in a particular condition of a physicochemical system. In a system of colloidal fibrils, or of longitudinal surfaces, into relation with which H-ions of lactic acid are ready to be brought, there is a potential of energy which may be discharged by a change in state of tension. Then upon recovery by oxidative removal of the lactic acid, the energy of combustion is partly discharged as heat and partly returned to the muscle in the restoration of the potential. The acid ions will be separated from the colloidal fibrils, so that the fibrils return to their former tension—that of rest. Carbohydrate is accepted as the reservoir of this energy for the muscle. The conception of this change in the physicochemical system of colloid fibrils accounts for the small energy change necessary to the breakdown of carbohydrate to lactic acid. This energy is demanded for the contractile act which also uses, perhaps, to a greater degree, the energy derived from the oxidation of the lactic acid, residing in the physicochemical system of the muscle, which was produced in the previous contraction. It would seem that the evolution of muscle has taken advantage of the acid phase of carbohydrate degradation and that thus lactic acid is given, through appropriate arrangement of the cell elements, a position in which it can induce those tension changes upon which animal movement depends. There is then no need to assume an unknown unstable chemical substance as the source of contractile energy. It is simpler, these investigators believe, to accept the existence of the potential energy in the relatively permanent physicochemical system of

the muscle which is obtainable as a result of changes in the physical configuration. Then sugar, at least, of the foodstuffs, may be considered the chemical mechanism handling the contractile energy.

JELLIFFE.

**McCrudden, Janney, Goodhart and Isaacson.** MUSCULAR DYSTROPHY AND THE VEGETATIVE NERVOUS SYSTEM. [Arch. Int. Med., 1918. Ed. B. M. J.]

Hypoglycemia, due to disturbance of the ductless glands is among the causes of muscular dystrophy, is the general conclusion of both these papers. McCrudden, who gives a summary of the available data, says that the myasthenia of progressive muscular dystrophy is due to hypoglycemia, which together with the fatty infiltration depends on impaired glycogenesis, the carbohydrate of the food being probably changed largely into fat instead of glycogen, and that this impaired glycogenesis is the result of disease of the adrenals or other endocrine glands. The article by Janney, Goodhart, and Isaacson, already commented on in this JOURNAL, contains, in addition to a critical review of the subject, the details of the observations on the metabolism of nine cases of muscular dystrophy, the patients being supplied with a creatinine-creatine-free diet from a special kitchen and kept in separate rooms under constant supervision by nurses trained in metabolic work. These patients showed a disturbance in the creatinine-creatin metabolism; the urinary creatinine was diminished in all the cases and was usually reduced in proportion to the severity of the cases; moderate amounts of creatine, which is not normally present, in the urine were found in all the cases, and in eight out of the nine cases the quantity of creatine exceeded that of creatinine. There was also constant hypoglycemia with impaired utilization of carbohydrates, or essentially the same metabolic picture as that recorded in myxedema, hypopituitarism, and Addison's disease, which are undoubtedly due to insufficiency of the ductless glands, and in animals after experimental removal of the thyroid or adrenals. Nearly all the patients gave skiagraphic evidence of bony changes, which the authors contend are not necessarily due to disuse, and other manifestations of disturbances of the ductless glands, such as pigmentation and dryness of the skin, hypertrichosis, unusual distribution of the subcutaneous fat, and both hypertrophy and arrested development of the genitals, were noted. Hypothyroidism was the most prominent condition, but the pituitary was unquestionably affected in one case, and the pineal possibly in two others. The conclusion drawn is that muscular dystrophy may in reality be only a symptom-group due to deficient function, not of one but of several endocrine glands separately or coincidentally affected. This endocrine failure causes hypoglycemia, and from the consequent interference with their normal carbohydrate supply the muscles weaken, atrophy and degenerate, and creatine appears in the

urine, while the excretion of creatinine diminishes. In this connection it is significant that the creatinine-creatine metabolism of muscular dystrophy closely resembles that of fasting, but even in prolonged starvation the sugar in the blood is maintained at the usual level, thus showing its vital importance; hypoglycemia would therefore reasonably be expected to give rise to excessive muscular wasting.

**Raeder, G.** SYMPATHETIC PARALYSIS. [Norsk. Mag. f. Laeg., Sept., 1918.]

This patient had a tumor lying between the Gasserian ganglion and the carotid plexus of the internal carotid artery. Headache, vomiting and pains in the left trigeminus distribution, with paresis of the left side of the palate, ptosis, miosis and reduced intra-ocular pressure were present. Vasomotor trophic and ocular disturbances were absent.

**Orr, David, and Rows.** THE INTERDEPENDENCE OF THE SYMPATHETIC AND CENTRAL NERVOUS SYSTEM. [Brain, 41, 1918. Ed. B. M. J.]

From their extensive investigations on infection and intoxication of the central nervous system, reported in previous numbers of Brain and elsewhere, Dr. David Orr and Lieut.-Colonel Rows distinguished two paths of invasion: (*a*) lymphogenous, passing up the ascending lymph paths of the cranial or spinal nerves, and giving rise by continuity to a primary inflammation of the fixed tissues; and (*b*) hematogenous, causing degenerative lesions associated with vascular dilatation, edema, and hyaline thrombosis, but with little, and then only secondary, inflammation of the fixed tissues of the central nervous system, dependent upon the irritative effects of the degenerative products, and upon the reaction incidental to repair. The lesions produced by experimental intoxication of the blood stream involve the white matter of the spinal cord in a non-systemic manner, two areas—namely, the periphery and the posterior columns—being affected, but in varying degrees at different levels. The brain showed coagulation necrosis of the nerve cells in the cornu ammonis, the cerebral cortex, and the amygdaloid nucleus, and also softening in the stratum moleculare of the cornu ammonis. From the distribution of these lesions it is clear that in addition to toxicity of the blood stream there is another factor which determines where the toxin shall exert its effect. The lesions in the cord and brain occur in the regions supplied by the blood vessels of the pia arachnoid, and there is a considerable weight of evidence in favor of the view that the sympathetic nervous mechanism is an important factor in determining the parts of the central nervous system to be primarily acted on by a poison circulating in the blood. The existence of vasomotor fibers in the brain has until comparatively recent times been steadily denied; but the action of adrenin has proved the presence of vaso-constrictors of the cerebral blood vessels, and non-medullated sympathetic fibers have been traced

from the main mass among the posterior roots to supply the vessels of the cord. Moreover, stimulation of the posterior roots has been seen to cause constriction of the blood vessels of the dura mater. Non-systemic lesions of the spinal cord characterized by atrophy of the myelin sheath and sclerosis and apparently due to some toxemia are described by the authors in cases of visceral cancer, in Addison's disease, and in subacute combined degeneration; these diseases show different degrees of the same pathological process, which is least advanced in visceral cancer and most severe in subacute combined degeneration. In Addison's disease the existence of adrenal inadequacy makes vaso-dilatation of the pia arachnoid vessels of the cord highly probable, and it is suggested that in these three diseases there is, as the result of some interference with the thoraco-lumbar sympathetic reflex, possibly caused by pathological stimuli or, as in Addison's disease, by the absence of substances necessary for its balance, increased permeability, depending on dilatation, of the vessels and so undue diffusion of the toxin in the underlying nerve elements. The authors feel justified in suggesting that if this assumption that organic lesions of the spinal cord may result from disturbance of the sympathetic system is correct, some functional disorders of the central nervous system have a like origin. In the discussion of this difficult problem they point out that the psychoneuroses of war demonstrate conclusively how disturbance of the sympathetic mechanism, of the endocrine glands, and morbid emotional conditions combine to bring about pathological psychic and nervous phenomena. It therefore follows that in the investigation of nervous disease, especially of the brain, all the collateral symptoms due to disturbance of all the peripheral organs intimately connected with it should be studied in addition to the symptoms obviously due to disorders of the central nervous system.

## 2. ENDOCRINOPATHIES.

**Cumston, C. G.** CLINICAL SYMPTOMS AND TREATMENT OF HYPERTROPHY OF THE THYMUS GLAND. [Edin. Med. Jour., July, 1917.]

Cumston regards thymectomy as unquestionably the operation of choice. Intracapsular enucleation is preferred and any attempt to remove the gland with its capsule results in severe loss of blood, and tends to produce injury of the pleura, pericardium and large vessels. Removal of the whole gland is not required, and the results of partial subcapsular thymectomy have been excellent.

**Uhlenhuth, E.** THYMUS AND PARATHYROID GLAND ANTAGONISM. [Jour. Gen. Phys., Sept., 1918.]

The thymus gland of mammals, according to this observer, contains a substance capable of causing tetany when fed to the larvæ of *Ambystoma opacum* and *Ambystoma maculatum*. If the larvæ have not developed their own glands, they are able to neutralize the substance caus-



ing the tetanic action of the thymus substance. When their own thymus secretion is added to the thymus material introduced, this control mechanism becomes inadequate. If the thymus is an organ by the perverted action of which tetany may be produced, Uhlenhuth says, we can understand why tetany in human beings occurs far more frequently in children than in adults, since in the latter the thymus gland is replaced, at least to a great extent, by connective tissue. The relation of thymus to tetany may also possibly explain the occurrence of tetany during pregnancy. The relation of the thymus to calcium is not worked out by the author.

**Cameron, H. C.** STATUS LYMPHATICUS FROM THE CLINICAL STANDPOINT. [British Med. Jour., June 9, 1917.]

The author suggests that (1) the lymphoid overgrowth so commonly found in *post-mortem* in children is no more than enlargement from the irritation of chronic catarrh in the corresponding mucous membranes; (2) such children during life show evidence of faulty nutrition or infection of all the epithelial structures, hair, teeth, conjunctiva and the mucous membranes of the respiratory and intestinal tracts; (3) there is usually present a wateriness of the tissues which is dependent to some extent upon excessive carbohydrate feeding and which is the main cause of vulnerability to infection; (4) local treatment of the catarrh alone is likely to be inefficacious and must be accompanied by a systematic attempt to achieve dehydration and improve the nutrition of the tissues; (5) the status catarrhalis is a predisposing cause of rheumatism and tubercle and carries with it a liability to sudden death at the onset of virulent infections, such as pneumococcal infections, measles or diphtheria.

**Symmers, D.** SOME ASPECTS OF THE STATUS LYMPHATICUS. [Am. J. Med. Sc., 1918, 156, p. 40. Ed. B. M. J.]

In an interesting article embodying much pathological experience at the Bellevue Hospital, New York, Symmers mentions that the credit for establishing the clinical signs of status lymphaticus really belongs to Charles Norris, who, in 1909, after four years' work at Bellevue on the subject, wrote an account of the diagnostic signs to von Neusser, his former teacher in Vienna. Two years later the Viennese professor brought out a paper on the diagnosis of status lymphaticus, which, in spite of grateful acknowledgment to Norris, has received undue credit, especially as Norris had, in 1909, published his observations in America. The "angelic child," described by the elder Gross as possessing the lymphatic constitution and prone to what is now called surgical tuberculosis, is the subject of status lymphaticus, as are also some coarse-featured children. After puberty its recognition becomes easier, the delicate velvety skin, the arching and rotund thighs, slender waist, in

males a small penis with an acorn-shaped glans, and pubic hair as in the female, and scanty hair on the trunk, mark the existence of this condition, which, generally speaking, is most familiar as the finding of a coroner's inquest. Symmers considers that the dangers of the condition are (1) that the instability of the lymphatic tissues provides a mechanism capable of so sensitizing the body as to produce anaphylactic phenomena varying from simple urticaria to convulsions and sudden death, and also lowers the resistance to infections, especially of the throat and alimentary canal, and (2) that the congenital muscular hypoplasia of the blood vessels renders them unable to withstand ordinary changes in blood pressure. Among 5,652 necropsies at the Bellevue Hospital, 457, or 8 per cent., showed this condition, which was six times commoner in males than in females. In addition to the status lymphaticus in youth, when the lymphoid tissues are active, a recessive form later in life is described. Contrary to von Neusser's statement, the spleen is not enlarged in uncomplicated status lymphaticus, though its lymphoid follicles were hyperplastic in 88 per cent. Necrosis of the germinal areas in the lymphatic glands is common, and in the recessive form is shown by areas of spindle cells. The anaphylactic reactivity of the body depends on the number of these necrotic areas, and sudden death is connected with the discharge of nucleo-proteins from them; sudden death is probably not due to rapid toxemia caused by the abrupt and simultaneous destruction of numerous follicles, but to anaphylactic shock subsequent to further destruction of the germinal areas—for example, after injection of a vaccine or serum, in an individual already sensitized by a previous discharge of nucleo-protein from necrosed germinal areas. As epilepsy may be an anaphylactic manifestation in the subjects of the status lymphaticus, it is suggested that the thymus and the spleen should receive X-ray exposures. Cerebral hemorrhage and miliary aneurisms in the brain in young persons are explained by the status lymphaticus; the aorta was found to be hypoplastic in 40 per cent. of 249 cases of status lymphaticus. The condition contraindicates work in a compressed atmosphere, and is commonly seen in those unstable emotionally, in alcoholics, suicides, and criminals. As a result of their hereditary anatomical imperfections the subjects of status lymphaticus are believed to be more susceptible than ordinary persons to the infective, psychical, and other factors that precipitate Graves' disease. Acute infections, such as acute endocarditis and cerebrospinal fever, are favored by the status lymphaticus, and the latter of these diseases then runs a remarkably rapid course. Symmers thus accepts the usual view as to the congenital origin of the status lymphaticus, and does not mention or criticize H. C. Cameron's contention that it is an acquired condition due to chronic irritation of the mucous membranes by a persistent, though perhaps quiescent, catarrhal infection.

**Jackson, C.** ACROMEGALY OF THE LARYNX. [J. A. M. A., Nov. 30, 1918.]

The literature of acromegaly of the larynx is scanty, and this seems strange, he says, in view of the fact that in a number of cases alteration of the voice is mentioned. He reports four cases observed by him which he hopes will stimulate closer observation for others. While these are too few for drawing final conclusions, they indicate that the larynx should be examined in every case of hypophyseal abnormality. The overgrowth characteristic of acromegaly in some cases involves the ligaments and soft parts of the larynx and makes changes sufficient to require tracheotomy to prevent asphyxia. In three out of the four cases, the laryngeal mucosa was normal, and in one, the chronic laryngitis was probably a coincidence. In three of the four cases, the laryngeal image was not symmetrical though this was not shown by external palpation. Altered voice in acromegaly may be due to laryngeal changes as well as to alterations in the resonating cavities, lingual enlargement, etc.

**Cumston, C. G.** NEOPLASMS OF THE HYPOPHYSIS AND ROENTGEN RAYS. [N. Y. Med. Jl., Nov. 23, 1918.]

Neoplasms of the hypophysis are among the number of pathological conditions requiring both radiodiagnosis and radiotherapy. The diagnosis of these tumors is frequently a difficult matter, particularly at the beginning of the process, on account of their silent evolution, the rather mild character of the symptoms, and the multiplicity and diversity of the morbid pictures which simulate them. The signs of intracranial compression, headache, vertigo, and vomiting; ocular disturbances particularly characterized by concentric narrowing of the visual field; an abnormal growth of the skeleton assuming the clinical type of gigantism and acromegaly; disturbances of the general nutrition realizing the type of genital infantilism with fatty overgrowth, such are the principal symptomatic forms, either isolated or variously associated, of neoplasms of the hypophysis. Given any of the symptoms which may lead one to suspect a growth in this gland, radiological exploration of the skeleton should always be methodically practised. When applied to the long bones, it reveals the condition of the epiphyseal cartilages, and whether they are ossified or have remained without adult changes beyond the normal time. It will decide if growth of the limbs has been achieved, if the height of the patient has arrived at its maximum or if the body may still grow; in other words, whether the case is one of fixed gigantism or gigantism still in evolution. Applied to the skeleton of the hands and feet when they are enlarged, it distinguishes the part due to hypertrophy of the soft parts from that due to an increase in the thickness of the osseous tissue, thus revealing the lesions of the bones properly belonging to acromegaly. Applied to the skull, it shows the unequal increase in thickness of the cranial bones, the varying spreading of the external and internal tables at different points, the enlargement of the cavities of the

face, the frontal, maxillary, and sphenoidal sinuses. Thus the diagnosis of the silent types of acromegaly is made. When directed to the sella turcica, it reveals its shape and size, particularly in the vertical and anteroposterior directions, showing if the cavity of the pituitary fossa is simply increased without broadening of the opening by which it communicates with the cranial cavity, or if it is both enlarged and more or less considerably excavated. It will also show if the bone structures, the clinoid apophyses and blade of the sphenoid, which circumscribe this opening, are preserved or have been more or less partially absorbed. Thus, indirectly, radiography reveals the existence of a new growth of the hypophysis, indicating its size to a certain extent, and even shows if the tumor is developing toward the nasal cavity or in the direction of the brain. By some clear cases, although not in large numbers, it is definitely proved that in certain neoplasms of the hypophysis, methodical radiations of the gland with Röntgen rays has resulted in a remarkable improvement in the symptoms, particularly in a decrease, at all events partial, of the ocular disturbances. Such fortunate results may be explained by the elective sensibility of the gland cells and neoplastic cells in general to the destructive action of the rays. Excepting instances of undoubted lues which should be treated with mercury, the treatment of tumors of the hypophysis reduces itself to two methods: the surgical removal and radiotherapy. On account of the necessarily incomplete and purely palliative action of surgical interference, radiotherapy should always be preferred, or at least it should always be attempted in the first place. Generally speaking, radiotherapy of growths of the hypophysis will be more successful when applied early, with method, and an irreproachable technic; hence the importance of an early diagnosis. In the ophthalmic form, it offers considerable chance of improving the ocular disturbances if atrophy of the optic papilla has not yet taken place. In the giant and acromegalic types, radiotherapy is of course powerless to cause a retrocession of the already acquired lesions, although it is quite capable of arresting the evolution of the abnormal skeletal growth.

**Tucker, B. R.** PITUITARY PSYCHOSES. [J. A. M. A., Aug. 3, 1918.]

The author reviews the known functions of the pituitary gland and its pathologic disturbances as bearing on the problems of adolescent insanity. In the adolescence period, in a few years the boy and girl pass into the man and woman, with special development of physical and sex characteristics, together with changes in the emotional, social and intellectual life. The imagination is over stimulated, judgment is not matured and there is a craving for the dramatic and mysterious, and extremes and excesses of opinion are more common than at other times of life. It is little wonder, therefore, that mental balance is so unsteady that it frequently topples over. Tucker classes his cases of adolescent insanity as follows, especially as regards the evidences of disturbances

of the pituitary function, taking them as a whole and not specially as based on disorders of the separate lobes of the gland: "Group 1. Those cases which gave evidence of preadolescent hypersecretion, with an apparent increased hypersecretion during adolescence. Group 2. Those cases which gave evidence of preadolescent hypersecretion with an apparent marked decrease in the secretion occurring during adolescence. Group 3 (a). Those cases with a preadolescent approximately normal history, in which during adolescence the secretion was increased. Group 3 (b). Those cases with apparently normal preadolescent secretions, which during adolescence seemed to have a decided decrease on the pituitary secretion. Group 4. Those cases in which there had been preadolescent hyposecretion, and in which, during adolescence, the secretion appeared to be still further decreased." Illustrative cases, thus diagnosed, of all these groups are given. Group 2 seems, to the author, the least common, while Group 3 is the largest of all. He concludes that adolescent psychoses exist, and can be thus classified, and that the roentgenographic findings, as shown in the case histories, agree with the clinical type. In the type showing decreased pituitary secretion the taking of pituitary gland extract appeared to be rather readily responded to.

**Schumann, E. A.** DYSTROPHIA ADIPOSEO-GENITALIS IN WOMEN. [Am. Gynecol. Assoc., May, 1918.]

The syndrome resulting from the effects of deficient pituitary secretion upon the female sexual system may properly be divided into three clinical groups, according to the sex epoch affected. The terms "amenorrhea of obesity" and "lactation atrophy" or superinvolution of the uterus are no longer correct, since it seems reasonably well proven that both these conditions are but phases of a primary hypo-pituitarism. Definite regression of the reproductive tract may follow deficient pituitary secretion in parous women of mature age, and may and frequently does give rise to erroneous diagnosis of pregnancy. Treatment for all groups consists in general measures and the empirical use of glandular extracts, the systolic blood pressure being a fair index of the particular gland substances to be employed; low pressure indicating pituitrin; high pressure, thyroid. The prognosis is guarded in all cases, as to recovery, but is favorable in direct ratio with the age of the patient.

## II. SENSORI-MOTOR NEUROLOGY

### 3. SPINAL CORD.

**Kirchberg.** THE CEREBROSPINAL FLUID. [Deut. med. Wch., 1918, 44, 657.]

The author here recommends for the qualitative and rough quantitative estimation of the amount of proteid in the cerebrospinal fluid the

use of a  $\frac{1}{2}$ -1 per cent. watery solution of sulphosalicylic acid. To a test tube containing a small quantity (few drops) of cerebrospinal fluid an equal quantity of  $\frac{1}{2}$  per cent. solution of sulphosalicylic acid is added and well mixed; if a clouding occurs, the proteid is pathologically increased in amount. For quantitative testing 2 c.c. of the cerebrospinal fluid and 1 c.c. of a 1 per cent. solution of sulphosalicylic acid are mixed in a Nissl's tube; the whole contents are allowed to stand for a quarter of an hour, and then subjected to centrifugalization; the quantity of deposit which is thus obtained serves as a measure of the proteid increase.

**Lenobe and Daniel.** ALCOHOL IN CEREBROSPINAL FLUID. [Proc. Med., 1918.]

These writers present further results of study upon this subject. Alcohol is able to remain in the cerebrospinal fluid indefinitely and without modification under aseptic conditions. If conditions are not aseptic it does not remain more than ten days at the most, but disappears, promptly undergoing chemical modifications. They call attention to the methodical significance of these facts. Great caution must be used in the examination of the fluid and account must be taken of the previous administration of drugs.

**Iida, H.** BERI-BERI AND THE CEREBROSPINAL FLUID. [Chugai Iji Shimpo (Home and Foreign Medical News), No. 895, July 5, 1917.]

The pressure of the cerebrospinal fluid was found to be greatly increased in certain cases of beri-beri, especially those in the acute stage. This was found to be 180-280 mm. in certain cases, and then as low as 100 mm. in slight cases. Miura has called attention to the observation that in these cases the blood pressure is low but that the cerebrospinal fluid is under high tension. A case in point was that of a young student seized with a violent attack, marked by exaggerated reflexes, vomiting, and motor disorders. The blood pressure was 60-80 mm. but that of the cerebrospinal fluid was 250 mm. Ten mills were removed from the spine and this reduced the pressure to 180 mm. but it rose again to 190 mm. At autopsy there was no meningeal lesion to account for the heightened fluid pressure. The question has arisen as to whether in this case the nausea and repeated vomiting were not caused by central irritation from the increased pressure. So with the heightened reflexes commonly observed at the beginning of an attack, but commonly attributed to more direct nerve irritation. The prognosis is very grave in cases in which the pressure increase is very marked.

Solutions of the cerebrospinal fluid of a patient with high pressure was perfused through the rabbit ear preparation and the number of drops flowing from the cut end of the artery was greatly decreased as a result. The powerful vasoconstrictor action of this fluid was thus demonstrated.



**Boyer, L.** ALBUMIN CONTENT OF CEREBROSPINAL FLUID. [Paris médical, June 15, 1918.]

Boyer recommends, for quick and accurate results, the diaphanoscopic method. The spinal fluid is treated with a solution precipitating albumins and then compared with a scale of standard solutions of albumin treated with equal amounts of the precipitant. The precipitant preferred is made by mixing thirteen grams of crystalline salicylic acid with fifteen mls of pure sulphuric acid in the cold in a porcelain dish. The mixture liquefies, then crystallizes. It is fused again with gentle heat, allowed to cool, enough distilled water is added to make 100 mls, and the resulting solution is filtered. The standard albumin preparations are made preferably with a mixture of blood serum from several persons. To one mil of serum are added seventy-four mls of normal saline solution, thus forming a 1 in 1,000 albumin solution from which greater dilutions, viz., 0.2, 0.3, 0.4 in 1,000, up to 1 in 1,000, are made by adding suitable amounts of normal saline. In each of ten small tubes of equal size, preferably discarded surgical gut tubes, are placed two mls of one of these dilutions of the albumin solution and one mil of the precipitant solution; the tubes are then sealed and labeled, constituting permanent albumin standards. For receiving the spinal fluid another tube of exactly the same size is used, with 2, 3, and 6 mil marks filed on it. Spinal fluid is introduced up to the first mark, precipitant solution up to the second, and the tube stoppered, shaken a few times, and compared with the standard albumin tubes, likewise previously shaken. The comparison may be made either by looking through the tubes toward the source of light or by reflection, the tubes being well illuminated and looked at against a dark background. Where the opacity of a specimen is greater than that of the standard 1 in 1,000 solution, saline solution is added up to the 6 mil mark and the figure resulting from the comparison multiplied by two.

**Larkin, John, and Cornwall, L. H.** SPINAL FLUID IN POLIOMYELITIS. [Arch. Ped., Aug., 1918.]

Larkin and Cornwall, on a basis of the examination of the cerebrospinal fluid in fifty patients with poliomyelitis, believe that the increase of the pressure is the most persistent of the changes in the spinal fluid. It does not disappear for several months. From the tenth day onward it is present in nearly all cases. In 93.5 per cent. of fluids examined from the first to the fifteenth day of illness there was an increase, 93 per cent. showed an increase in globulin and appeared before the pleocytosis and persisted longer. This pleocytosis was present in 86 per cent. of fluids. The small lymphocytes predominated. Leucocytosis was highest during the first ten days, averaging 18,500. No curve noted with the colloidal gold reaction diagnostic of anterior poliomyelitis and there was no parallelism between the colloidal gold curve and

the other spinal fluid or blood findings. The higher curves were more frequent from the tenth to the fifteenth day. Sixty-three per cent. colloidal curves were humped, five fatalities of forty-nine cases, one fluid gave a curve to two, three fluids gave curves to three, and one fluid gave a curve to four. Three of the fluids from fatal cases were humped or of the syphilitic type, and two were descending, resembling the so-called paretic type.

**Amoss, H. L.** SURVIVAL OF POLIOMYELITIC VIRUS IN BRAIN OF RABBIT. [Journal of Experimental Medicine, March, 1918.]

In a study of the relation of the filterable virus of poliomyelitis to the rabbit, with the idea of bringing out resemblances to or distinctions from, the streptococcus, and of determining its power of survival in the brain *in vivo*, Amoss found that suspensions of the central nervous tissues of monkeys containing the active filterable virus of poliomyelitis might be injected into rabbits' brains without producing symptoms, if the volume of injection be not sufficient to cause increased intracranial pressure. This was the only symptom produced by the suspensions. Suspensions of the rabbit brain tissue from the original site of injection were then reinoculated in monkeys, and by this test the active virus of poliomyelitis survived in the brain of rabbits for four days, but after seven days, it could not be demonstrated by this test. The virus of poliomyelitis is not adapted to the rabbit; it neither produces lesions nor survives long in its central nervous organs, in this way differing from some streptococci cultivated from poliomyelitic tissues. A monkey was immunized against a streptococcus cultivated from human poliomyelitic nervous tissues and was tested for neutralizing action on the filtered poliomyelitic virus and for protection against an intracerebral inoculation of the same virus. The serum of this monkey agglutinated the strain of streptococcus in a dilution of 1:4,000. It was without neutralizing action on the filtered virus; it also was not protected against the effects of an intracerebral inoculation of the filtered virus. Amoss concludes that this work furnishes additional reasons for believing that the streptococcus cultivated from cases of poliomyelitis differs essentially from the filterable virus, and is not the microbic cause of epidemic poliomyelitis.

**Peckham, F. E.** POLIOMYELITIS. [J. A. M. A., Aug. 10, 1918.]

The author describes a technic of fascia transplant in poliomyelitis previously published by him in the Rhode Island Journal of February 2, p. 38. The method is described in a case report. The advantage claimed is that there is a long anchorage for the correction of valgus deformities, nearly the whole length of the leg, and the remaining good muscle, whether tibialis or common extensor, steadies the foot, while the Achilles tendon pulls up the heel. A second case is also briefly reported. The children not only walk but walk without braces.

**Flexner, S., Amoss, H. L., Eberson, F.** PHYSIOLOGICAL STIMULATION OF THE CHOROID PLEXUS AND EXPERIMENTAL POLIOMYELITIS. [Archives of Internal Medicine, May, 1918.]

The inability of the active filterable virus of poliomyelitis to pass the choroid plexus and blood vessels of the central nervous system is accepted as the reason why infection through the blood cannot usually be induced in monkeys. The introduction however of sterile irritating chemical substances from without by lumbar puncture into the subarachnoid space, injuring the choroid plexus and blood vessels of the meninges and perhaps of the central nervous organs also, breaks down this defense against infection. This led the experimenters to test whether such change could be brought about in the choroid plexus from within as well as from without and functional rather than organic. Use was made of the fact that the choroid plexus secretes the cerebrospinal fluid from the blood with a highly precise discrimination as to quality and quantity of constituents. A hormone present in the plexus and to some extent in the brain is the active agent, this being liberated into the blood. Experimentally therefore the amount of cerebrospinal fluid may be increased within a unit of time by increasing the amount of hormone in the blood. It was found that intravenous injections of extracts of choroid plexus stimulated the secretion of the cerebrospinal fluid but this was not sufficient to induce infection through the choroid plexus. By testing control monkeys with the virus it was found that the virus in certain cases was strong enough to have caused infection by simple intravenous injection. Care was taken to use further, therefore, virus less active but still sufficient to cause infection if enabled to pass the choroid plexus barrier. The action of the virus used in the various experiments varied therefore according to the strength of the virus and also the susceptibility of the different monkeys in producing infection, the latter a factor always to be taken into account, but in all there was no evidence that the increased functional activity of the choroid plexus influenced the results. It exerted neither a positive influence making for infection nor a restraining influence if infection was otherwise produced. And yet very slight structural changes suffice to induce infection.

**Rosenow, E. C.** POLIOMYELITIS. [J. A. M. A., Aug. 10, 1918.]

Rosenow reviews the more recent literature, including his own reports, of the horse serum treatment of poliomyelitis, and reports a number of sporadic cases and records experiments on the use of the serum in the rabbit, and also emphasizes the importance of early diagnosis of the disease. The serum used in these cases, as in the cases of epidemic poliomyelitis, was injected intravenously, as it had been found that intravenous injections were necessary to protect monkeys against intracerebral inoculations of virus. Intraspinal injections of horse serum,

as has been shown by Flexner and Amoss, increase markedly the susceptibility of monkeys to poliomyelitis, so much so as to render them susceptible to intravenous injections of virus. The largely negative results reported by Amoss and Eberson, in regard to the therapeutic power of Rosenow's serum in monkeys would appear to be due to the fact that they gave exclusively intraspinal injections instead of intravenous ones. To facilitate slow infection the serum was diluted with an equal quantity of salt solution, but was not activated with guinea-pig complement. Animal experiments are also reported. The author's conclusions are that the results of the serum treatment of acute sporadic poliomyelitis, as in the epidemic form of the disease and in experimental poliomyelitis in the rabbit, are so strikingly favorable as to leave little doubt as to the value of this treatment. Hence the importance of early diagnosis is also manifest. It cannot, he says, be too strongly emphasized that the disease has a quite characteristic syndrome warranting a tentative diagnosis and immediate spinal puncture for its confirmation. "If a patient has symptoms suggesting involvement of the central nervous system, and shows an increased amount of spinal fluid, an increased number of cells with mononuclears predominating, and a positive globulin test, the serum should be administered immediately. If further study should prove the symptoms due to some cause other than poliomyelitis, no harm will have been done, while if the treatment is delayed irreparable harm may occur." It is realized, Rosenow says, that a large number of patients must be treated before final conclusions are deduced, and since the sporadic form appears to yield to the treatment there should be a supply of the serum in the hands of many. A large and available amount of the serum believed to be as effective as that used thus far, is on hand, and will be sent gratis to those who have the opportunity to use it and who will furnish records of cases.

**Acuña, M., and Casaubon.** SEROTHERAPY OF POLIOMYELITIS. [*Arch. Lat.-Amer. de Ped.*, Jan.-Feb., 1918.]

Four cases of poliomyelitis are here reported treated by the serum of convalescent poliomyelitis patients. The promising outlook for this form of treatment is dwelt upon although their own results were not encouraging, as the disease was in an advanced phase in all, paralysis having been observed for five or seven days. After four days the authors think little can be accomplished, and the more recent donors' convalescence the more effectual the serum. The patients were 7 to 20 months old, and the dose injected 2 to 6 c.c. to a total of from 7.5 to 38 c.c.

#### 4. MID BRAIN AND CEREBELLUM.

**Claude, H., and Lhermitte, J.** THE INFUNDIBULAR SYNDROME. [Presse Médicale, No. 41, July 23, 1917.]

Claude and Lhermitte had opportunity to study over a long period, with the necropsy findings, a case of tumor back of the chiasm, pushing apart the peduncles while the pituitary body and the sella turcica seemed to be normal. The cystic tumor had developed at the expense of the lining of the third ventricle, and the set of symptoms induced by this lesion included disturbances in vision, in articulation of words, and in the character, as well as disturbances in the circulation, in the sleep function and in the regulation of water distribution, polyuria and polydipsia. The clinical syndrome thus confirms the findings with experimental lesions in the ventral region of the third ventricle.

**Salmon, A.** OCULOCEREBELLAR SYNDROME AND ALTERNATING HEMIPARESIS DUE TO A TUMOR OF THE POSTERIOR CORPORA QUADRIGEMINA. [Riv. di patol. nerv. e ment., 1917, XXII, 505.]

Tumors of the corpora quadrigemina are comparatively rare. Valobra in his thesis collected 56 cases from the literature in 1910. The author's case observed in an infantry officer who had contracted syphilis three years before and whose Wassermann test was strongly positive. This patient showed the following syndrome: cephalalgia, vomiting, paralysis of the left superior oblique muscle, nystagmus, cerebellar ataxia, right-sided hemiparesis suggesting a tumor of the quadrigeminal bodies, localized particularly at the posterior bigeminal eminence. It is just at this point that the fourth nerve is in close contiguity with the posterior cerebellar pedunculi; hence the association of paralysis of the fourth nerve with the ataxia of cerebellar type. The patient was placed on an intensive mercuric treatment and the symptoms rapidly abated. The author feels justified in classifying this case as a tumor of the posterior corpora quadrigemina, as the symptoms corresponded perfectly to those known in such cases. The alternating syndrome, fourth nerve paralysis on one side, hemiplegia or hemiparesis of the opposite side, shows an unilateral mesencephalic lesion situated about a posterior bigeminal eminence since it is in this region that the fourth nerve originates and departs on its course.

**Ingvar, S.** CEREBELLAR FUNCTION. [Hospitalstid., Aug. 28, 1918.]

The author presents an extended discussion of cerebellar physiology and generalizes his position by stating that the main function of the cerebellum is to regulate the static and kinetic forces of the body, compensating for and regulating by reflex action the attraction of gravity and the forces of inertia.

Brun, R. STRUCTURAL DEFICIENCIES IN THE CEREBELLUM. [Schweiz. Arch. f. Neur. u. Psych., Vol. I, No. 1, 1917.]

Brun introduces the first part of his discussion with a reference to the progressive steps in recent knowledge of structural defects. They are based on a theory of arrested development with a secondary process which further modifies development in a variety of ways; so that the original picture of retardation may be to a certain degree obliterated. This theory not only throws light upon structural anomalies but also upon the processes of ontogenetic development and the dynamics of the processes of development. Also it has taught that even remote brain structures, in inner anatomical or functional dependence upon some area which has developed little or none, can later experience circumscribed secondary or correlative retardation. Among the studies made of the various divisions of the brain the cerebellum has received but little attention and therefore he reports from a rich material upon the defects in this portion of the brain. These defects are those that manifest themselves in the intra-uterine period or the earliest postnatal years and may include those defects which first manifest themselves perhaps later in the first decade of life but which are due to an inherited factor in the germ plasm, whose action has at first remained latent. The embryonal nerve tissue may be subject to a more or less profound disturbance, which may under certain circumstances develop further beyond the time of the primary disturbing factor but which first passes through a latent period and it may become later complicated in its development and its intermingling with other disturbance. Here however traces can be found of the original fetal disturbance, if they are carefully searched for.

The causes for the origin of malformations are not single ones. They are those which affect the germ plasm, giving rise to primary endogenous retardations and those due to general or local pathological processes in the embryonic period, giving rise to secondary pathological retardation. The former can be established by absence of residue of an inflammatory process. Yet the presence of such does not exclude the primary process, for even the inflammatory process may be the secondary result of the endogenous disturbance and certain toxins may exert both a primary and secondary influence. Not only is an affected part of the brain in the embryonic period excluded from further development but experience shows that there are regularly in other parts of the embryonic brain secondary disturbances of development of a serious character. These are those immediately adjacent belonging to the same Anlage and those of other sections which would later be closely related to the affected part anatomically or functionally. If only the latter is true it is difficult to distinguish atrophy from malformation.

Brun discusses as his first group of cerebellar malformations the total or unilateral congenital defects. Complete absence of the cerebellum is very rare and even so it has not really been complete. This



has been referred to a localized inflammatory shrinking process taking place at a very early stage. The more frequent unilateral defects must also take place at a very early stage. In both these cases there is always a severe correlative interference with the development of other portions of the cerebellum. There is however often complete functional compensation. The absence of clinical symptoms often observable can be possible only when a congenital defect acquired in the early embryonic period has been compensated for functionally by the cerebrum.

The simple hypoplasias, to which belong most of the cerebellar defects of the literature, may be of the "pure type" where the morphology has remained of a primitive type at an early stage of development. They may be those rare cases where the cerebellum has been thought to be of normal development but of very small proportions. These have not been sufficiently studied. Then there is the group of fetal atrophies and scleroses. We are led to believe here that the primary cause of Friedreich's disease lies in an endogenous embryonic injury to the cerebellar system. The crossed hemiatrophies of the cerebellum also belong here and likewise probably those cases described by Nonne where the cerebellum is normal except for its small size and which clinically show essentially the course of an atypical Marie's disease. There is usually with this a general diminution in size of the rest of the central nervous system.

Brun thinks that the malformations of the cortex partially but irregularly distributed over the lobes of the cerebellum, which are without exception associated with corresponding disturbances in the cerebrum, point to a common primary endogenous cause. The condition of the entire *Anlage* of the embryonic medullary tube has been too much overlooked in studying cerebellar malformations. He notes also that in almost all cases of cerebellar structural defect the lateral lobes are much more affected than the vermis and the flocculi, all of which contradicts the local pathological origin of these defects.

Brun concludes from the detailed macroscopic and microscopic autopsy report which he presents that it represents an architectonic disturbance of a higher order and not a finer histotechnic disturbance. The patient was a female, born prematurely, of a healthy family. The father may have been alcoholic but there was no evidence of lues. The head was always small. There was from the second month a muscular restlessness of the extremities, often twitching or jerking and the head and eyes were in constant motion. There was but little sign of intelligence. Shortly before death there were clonic convulsive movements of the upper limbs and intermittent trembling of the hands. The lower limbs remained flexed. The child died at the age of 10¾ months, of intestinal invagination and deglutition pneumonia. His findings are as follows: An aplasia of the neocerebellum with partial microgyria and pseudosclerosis of rudimentary convolutions in the caudal portion and development here and there of an enormous layer of tangential fibers in

the cortex. Also symmetrical paramedial cortical heterotaxia in the frontal inferior vermiform process instead of the amygdalæ, which are wanting. There were some small subcortical cortical heterotopias in the pyramids of Ferrier.

Complete normal morphological development of the paleocerebellum, flocculi and vermis, the latter however on the whole underdeveloped in size.

Island or necklace formation of the segmentation of the gray matter of the nuclei dentati in the form of countless rounded nests with knots of axons and neuroblasts in the center, the differentiation of which grows less laterally and ventrally. Dorsomedially it forms a "spur."

The appearance of a great mediofrontal nuclear mass medial from the nucleus dentatus with strikingly large cells and rich axon development.

Absence of the nucleus of the roof of the fourth ventricle, the fountainlike interfastigial fiber decussation and the basal layer of the large commissure of the vermis.

There is also general hypoplasia of the spinal cord as of the whole brain stem. Furthermore in the cord, backward myelinization in the area of Gower's tract and of the sulcomarginal tract, with marked hypoplasia of the cerebellar-lateral column tracts chiefly of Gower's bundle.

In the medulla there is embryonic retardation of the lateral portions of the inferior olive in all the frontal plane, with secondary degenerative and sclerotic tissue changes as well as retardation in other portions. The medial folds of the olive and the medial and dorsal portions of the accessory olives are normally developed. The lateral olivocerebellar fibers are wanting. In the nuclei funiculi lateralis the large cells of the lateral nuclei are wanting and there is high grade hypoplasia of the medial paraolivarian portion.

On the left side there is an enormous pyramidal-cerebellar bundle. The nuclei arcuati and the ventral fibers of the marginal arch are not present.

There is evident hypoplasia of the nuclei of the dorsal tracts, particularly in the nucleus cuneatus. The molecular substance and small nerve cells have suffered in the IAK plexuses and even in the nucleus triangularis. The arcuate striæ of Piccolomini are entirely lacking. The fine network of medullary fibers in the cranial nerve nuclei on the floor of the fourth ventricle are deficient, particularly in the dorsal vagus nucleus. The fibers of the middle peduncle of the cerebellum are very deficient. In the pontile gray the only portions showing any thing approaching normal development are the peri- and intrapeduncular plexuses within the middle and frontal third of the pons. In the tegmental portion there is widespread aplasia but retention of part of the raphe nucleus and of the nucleus reticularis tegmentum. There is extreme hypoplasia of the superior peduncles and of that portion of the tegmental decussation at the superior peduncles. The nucleus ruber is enor-

mously reduced and there is hypoplasia of the gray plexuses, also of the ventral peduncular tract of Bechterew and the frontal and temporal pontile tracts of the peduncle are imperfectly myelinated. The cerebrum in general shows slight retardation. There is isolated cortical heterotopia and microgyria in the occipital lobes.

The second patient, who is reported upon was a boy of normal birth of healthy parents, with no indication of lues. Apoplexy and psychosis had manifested themselves in the grandparents. The child showed retardation in his mental development. Most striking was the difficulty he had in moving himself and he was never able to sit alone. He showed choreiform movements in the upper and lower extremities, with tonic extension in the intervals. He died at  $1\frac{1}{4}$  years.

The cerebellum proved to be strikingly small and the hemispheres were much reduced and the pons was very poorly developed. The microscopic findings were as follows: High-grade symmetrical hypoplasia of the lateral lobes with primitive sulcus and lobe formation, though the cortex was normal in its tectonic and almost so histologically. No pathological changes. The vermis and the flocculi were normal. The lateral medullary substance was much reduced in volume. There was island-like segmentation of the nuclei dentati with retardation of the lateral portions at a fetal stage as in case I. The dorsofrontal portion of the nuclear conglomerate was abnormally developed. The medial portion of the nucleus of the roof of the fourth ventricle showed a high-grade hypoplasia. Marked hypoplasia also existed in the vermis commissure and the interfastigial decussation was absent. The lateral bundles were moderately small, and Clarke's columns strikingly so with poor cell development. There was a deficiency in the large mother cells in the frontal third of the nuclei gracilis and cuneatus medialis. The nucleus cuneatus lateralis was normally developed. The IAK was normal. The inferior olive was much reduced in volume with hypoplasia, atrophy and partial degeneration and partial segmentation in portions. The medial folds were intact as were the medial and dorsal portions of the adjacent olive. The arcuate nucleus was wanting and the ventral zonal fibers. The arcuate striæ were wanting. The middle peduncle and the pontine gray were much reduced in some portions. Likewise the red nucleus was much reduced except that the giant cell network was intact. The superior peduncles were greatly reduced. There was hypertrophy of the putamen. [J.]

**Elsberg, C. A.** NEUROFIBROMA IN THE CEREBELLOPONTINE ANGLE. [*Annals Surg.*, Oct., 1917, p. 509.]

Patient a man 50 years of age. Tumor successfully removed from the right cerebello-pontine angle by bilateral suboccipital craniotomy. Tumor enucleated inside of the capsule. The patient was presented in order to call the attention of surgeons to a method of removal of these tumors which has been very satisfactory, and which has markedly

lessened the mortality for these operations. Small tumors (up to the size of a cherry) in the cerebello-pontine angle can be safely removed with their capsule. Large tumors are usually closely adherent to the sides of the pons and medulla, and their removal *with* the capsule is very apt to cause a secondary softening of these structures. A slight hemorrhage in this region is only too apt to result fatally. Neurofibromas in the cerebello-pontine angle grow very slowly and are clinically benign. They do harm only by pressure. It does no harm to leave the capsule behind. Therefore if, when such a tumor is exposed, it is found to be of large size, no attempt should be made to remove it with its capsule, but an incision should be made into the capsule, and with a sharp curette all the tumor should be scraped away. Although the capsule is usually fairly tough, care must be taken that the capsule is not perforated. All the manipulations should be done with gentleness, and special care should be taken when curetting out the mesially placed portions of the growth.

By this method all of the tumor is removed within its capsule and the capsule is allowed to remain behind. The intracapsular enucleation of tumors in the cerebello-pontine angle is a very satisfactory method of procedure, and the large majority of the patients recover from the operations.

**Düring, M.** CLINICAL STUDY OF CEREBELLAR CYSTS. [Correspond.-Blatt fuer Schweizer Aerzte, Aug. 18, 1917.]

Düring's patient was a woman of 32, with three healthy children. She had been healthy except complaining of pains in the back of the neck since childhood. During the last four or five months there had been much headache, dizziness and vomiting and a brain tumor was suspected in the left cerebellum. The woman succumbed to respiratory paralysis while being prepared for the operation at the fifth month. A cyst as large as an egg was found in the left cerebellum, with a small glioma projecting into it, relics of a larger tumor, possibly. He discusses the symptoms in this case, particularly those for which the disturbance in the adjoining pons and oblongata were responsible. These remote deficit symptoms are particularly important for differentiation of intracranial tumors. The total paralysis of the left vestibular nerve was accompanied by total left facial paralysis, but the fact that the hypoglossal escaped excluded hemiplegia from a focus in the frontal lobe or anterior segment of the internal capsule. The data of this case sustain the assumption that paresis of the extremities has a cerebellar basis. Sensory disturbances are rare with tumors in the posterior cranial fossa. Puncture of the brain seems to be the only safe means to differentiate between cysts and tumors. It has given good therapeutic results, also, in the hands of some. Palliative puncture of the ventricle may be indicated in certain cases, Düring adds, puncturing at the point where pressure is highest. He calls attention further to the very high pressure

noted in the ventricle on the opposite side in his case. Internal hydrocephalus is largely occipital as there is less white substance here to interfere. The occipital lobe stands puncture well.

**McNab, G.** CEREBELLAR ABSCESS COMPLICATING MASTOID EMPYEMA.  
[Med. Jour. South Africa, Nov., 1917.]

A girl of ten was admitted to the hospital with typical mastoiditis and was operated upon within 12 hours. A complete exenteration of the mastoid was done with exposure of the middle cranial fossa and lateral sinus. The following day vomiting set in and occipito-frontal pain was complained of. Pulse and temperature normal. This continued for ten days when the little girl began to show incoördination of her corresponding arm in that she was unable to point accurately to the tip of her nose with her right index finger. She also had difficulty in drawing a horizontal line to stop at one drawn perpendicular but passed it by 2 or 3 mm. (hypermetria). Her pulse fell to 56 and her temperature fell to subnormal. The mastoid wound was accordingly reopened and carefully searched, and as no trace of thickened dura could be found in the cerebellar region the mastoid incision was extended backwards and downwards and a craniotomy carried out with a Doyen's trephine. The following day there appeared slight mental dullness and delayed cerebration. She had well-marked adiadokokinesis and she could not touch the sound knee with the heel of the affected side. She could not make a dot on a piece of paper but could make a line instead of a dot. The craniotomy flap was reflected and after due preparation the brain was entered with a blunt tenotome inwards and strongly forwards. An abscess was reached and about 2 drams of foul smelling pus evacuated. Uninterrupted recovery.

**5. MENINGES.**

**Delanglade.** TREATMENT OF SUBDURAL HEMATOMA THE RESULT OF WAR INJURY. [Presse Medicale, Dec. 3, 1917.]

Delanglade reports on two cases of skull wound by shell fragments, with subdural hematoma. The dura, upon exposure, was found blue in color, tense, devoid of pulsations, but unperforated. One patient was in complete coma, the other in a state of concussion with vomiting and mental confusion. No incisions in the dura were made, but the injured soft tissues were excised, the osseous defects regularized, and the wounds entirely closed save for the institution of filiform drainage. No complication followed. The author is inclined to agree with De Martel that primary opening of the dura is never indicated in cases of this type. Decompression is sufficient to relieve pressure, with lumbar puncture added, if required. Hasty incision of the meninges and exposure of a focus of cerebral contusion to the air opens the portals to infectious complications. A hematoma left undisturbed will probably become absorbed, and

if exposure is later required, the adhesions formed will have circumscribed the morbid focus.

**Guillain, G.** MENINGEAL HEMORRHAGES IN WAR PATHOLOGY. [Pr. Med., Sept. 5, 1918.]

Meningeal hemorrhages make up an important chapter in the war injuries, resulting both by reason of projectiles and from faulty aviation landings or from falling. Meningeal hemorrhage may escape detection, or symptoms later may reveal it only later, unless lumbar puncture is done. Shell concussion, in addition to the meningeal hemorrhage, may give rise to bleeding from lungs, nose or stomach. Excitement, with confusion, exaggerated tendon reflexes, bilateral clonus and Babinski, contralateral reflexes, and defense reflexes, mydriasis, uneven pupil reactions, disturbance in reaction to light, and massive albuminuria. These are among the most frequent symptoms. In some jaundice suggests meningeal hemorrhage. In a number there was high temperature for days not due to infection but to disturbance in the heat regulatory mechanisms. Lumbar puncture is not only of value in diagnosis but also therapeutically.

**Ryland, A.** LATERAL SINUS DISEASE; INFECTION OF MENINGEAL SPACES; RECOVERY. [Jour. Laryngol., Rhinol. and Otol., March, 1917.]

The lateral sinus disease followed a suppurative otitis media of the left ear of five months' duration complicated by acute mastoiditis. At operation, however, no clot within the sinus was found. The conditions present were the following: (1) Diffuse osteitis of the mastoid process and cells. (2) Perisinus abscess. (3) Phlebitis of the lateral sinus wall. (4) During the period of convalescence there appeared marked retraction of the head, stiffness of the legs and Kernig's sign. There were no ocular signs of facial twitching. Lumbar puncture was negative, and subsequent to the puncture the temperature dropped from 104 to normal. A second lumbar puncture revealed a growth of streptococcus.

**DeMassary, Tockman and Luce.** MUMPS MENINGITIS. [Bull. de l'Acad. de Med., July 3, 1917.]

In 635 soldiers suffering from mumps there was a lymphocytic meningeal reaction in 56 cases and of these 16 developed meningeal symptoms. In addition to the lymphocytosis the cerebrospinal fluid in mumps generally showed an excess of albumin, very frequently a reduction in chlorides and almost always an increase in sugar.



## Book Reviews

**White, William A.** THE PRINCIPLES OF MENTAL HYGIENE. New York, The Macmillan Company.

Modern knight errantry takes up a hammer and wields a few short, sharp, effective blows. Constructiveness and not destructiveness, punitive or otherwise, is its aim. This is the manner of White's writing, and this is the spirit of his subject matter. He has taken the principles which psychoanalysis has opened up to modern thought and to modern practical living and applied them briefly, tersely, but with telling strokes to the most pressing questions and problems of modern social life. He is not chiefly concerned in this book with individual analysis, but he utilizes the principles discovered at work in individual psychology, particularly as they are revealed by taking into consideration unconscious motives and the illumination that proceeds from that part of the mental life. These he applies to the society which is made up of these individuals and in which such motives and such unconscious forms of thought are largely active.

In such a broader survey he is in a position to understand both wherein society is diseased and in need of a hygienic renovation, and also to understand more fully than has been the case just what social disease of any sort means. This he finds, as in the individual, in inability and infantile unwillingness—unconsciously so—to make the necessary adaptations to difficult reality and to face issues which arise and meet them in a straightforward effective manner. Hence arise all sorts of disguising mechanisms which hide the real issues and substitute some indirect and false solution for problems and some distorted handling of them.

In order to make this clear he discusses first the underlying concepts through which these things have become understood to the social psychologist and then the mechanisms by which the imperfect compromise adjustments are made. He places against such a background society's conception of insanity and then insanity in its actual meaning. The problems of the criminal and the feeble-minded are brought to the same touchstone in order to expose the false social conception of them and their mistaken treatment through the defense mechanisms which society is unconsciously using. In the same clear well directed manner other social suggestions are reviewed in such light. This is all done in the spirit of constructive understanding which should help society to grasp its own too often mistaken position, its self blindness and to readjust its

methods of approaching these problems and dealing with them. Some space is also given to the ailments which the author calls relatively minor ones in view of the fact that they concern not the large social groups but individual lives, but which manifest themselves in the same inefficiency in meeting life's realities and the substitution of imperfect ways. These are in neuroses, to which, as White shows, psychoanalytic therapy applies these same principles of understanding and readjustment which are needed for social reconstruction. Individual and social hygienic reconstruction are thus closely linked and it is indeed in the socialization of the energy which has become imprisoned in the neurotic individual that his regeneration is attained. The author lays emphasis in the summary upon the one basis for a real and effective social hygiene, which will adjust the problems between society and the individual and free both from misunderstanding and repression, which only lead to unsocial conduct. This is that of a scientific interest which "will be able to see facts in their real settings and give them their true values." This means the recognition of the inadequacy, rather than a moral defect or delinquency as ordinarily conceived, as the source of the failures. And it involves the understanding of the causes for such inadequacy and failure, through which causes both may be reconstructively attacked.

JELLIFFE.

**Woodruff, Helen S.** *THE IMPRISONED FREEMAN.* New York, George Sully and Company.

Such a book as this can seem exaggerated and emotionally untrue only to those who are complacently ignorant, and willfully so, of conditions which are abroad in the very constitution of society. Whether the author is dealing with the circumstances of her characters outside the walls of a typical penal institution or the life within these, she is presenting actual facts of society. Through her book, her fearless handling of these more or less hidden things, through her revelation of the interworking of various causal factors producing a lamentable train of results, she shows how much these are actually all a part of our social world. We are accustomed on the one hand to pride ourselves upon certain features of society and congratulate ourselves on our safety and aloofness from the doings and tendencies, the character of the criminal class. They may perhaps be counted as unfortunate individuals, but are not to be considered too far. So on the other hand society has provided for them the proper institutions for correction, discipline and punishment, and sees to it strictly that they receive the full benefit in just the way complacent society has provided and only in such a way. For the rest no concern, or only concern to advertise one's own self righteousness and superiority over against the stained history and marred personalities of the victims of these social provisions.

Just this has been put into the forceful form of fiction in a story which presents another inner side, that of the man or the boy who himself is an individual, too, perhaps with far more responsibility for development and usefulness than those who incarcerate him, those who condemn and hound him against his own hard effort, into criminal behavior. The falseness of the whole system of so-called reform and penal systems is shown up, from the Home supposed to be devoted to child training to the State's Prison with its dark and hidden abuses. Those who know of these things as they actually exist and also of the strange blindness and self righteousness in individuals which permits and exalts such behavior toward the child and toward the criminal as that exhibited by the father of the "Imprisoned Freeman" will acknowledge that the book is not occupied with exaggerated or falsified statement.

A certain truer artistic balance would have eliminated some over sentimental setting occasionally and have emphasized its truths in a more lastingly impressive way than by the rather too frequent "preachments" of the story. Also in the interests of the novel the author has leapt over too swiftly to a utopian ending in regard to reform. However her purpose is sincere, her story a vital one carrying her readers straight into the heart of facts, which should cry aloud to society. It touches also briefly upon the psychological as well as social difficulties which beset every individual and on their part condition his behavior and history. The book deserves to be read and accepted by thinking men and women as a part of a truly constructive effort after reform.

L. BRINK.

**Boodin, John Elof.** A REALISTIC UNIVERSE. An Introduction to Metaphysics. New York, The Macmillan Company.

This vitally constructive work represents the author's attempt to restore to metaphysics its true place and use it in its relation and service to things as they are, to scientific and social problems. In this idealistic systems prove themselves existent as practical working realities and it is the author's endeavor to show that these have their place along with more materialistic conceptions in the well-conceived and well-balanced philosophic conception of reality. Metaphysics then stands as one of the necessary sciences, as indispensable to other sciences as they are to it.

The bit of rhapsody in which he allows himself indulgence sets his program for discussion, as he writes of the constellations of energy which constitute being, the effect upon the latter of the real factor time, a change value real and undervived, apart from that which it influences; the truth of space, it too apart and independent yet forming an indispensable condition for energy systems; consciousness lighting the world with interest and value; and form which gives direction to the process of evolution and which gives the worth of which we become conscious.

Boodin believes the universe as a whole, or reality, to be more than any one of these aspects in which it appears, or of any of the systems of it which have occupied metaphysical thought now in one way, now in another. There is room for these systems, there is necessarily an overlapping of them. This truth however cannot be comprehended in the old static ways of approaching it. They were correct perhaps as far as they went, but they were only partial and incomplete. Now this static conception must give way to a view of dynamic processes and in this "being-energy."

Energy itself must be estimated by what it does, and this in systems of reality which serve our special purposes. These systems may have certain practical standardizations which serve descriptive purposes, and with these, as they belong to the simpler systems, we can understand and deal with those more complex. The author is exceedingly modest in discussing the actual existence of things and is willing to admit that since we cannot positively answer the long vexed questions involved in the reality of things as they have appeared to common sense, we must believe that the substance of them is precisely what they appear, we must take it in experience. This attitude does not prevent an able investigation into how things are known, both how thinkers have tried to know them or explain the knowing and how they are taken, when we pragmatically consider them, in our systematized experience.

Neither is Boodin bound by a constant and static conception of the knowing mind. To him the energetic stream of feeling, of tendency, interest, will, all of which make up the activities and content of the self, or which, manifested in activities, convince us of the reality of other minds, is present in experience satisfying social expectancies, as he says. They constitute the identity of self and bring it into pragmatic relationships and activities. Within these he believes there is an inner aim, a focal factor upon which modern thought is coming to lay more emphasis. This by no means lies necessarily in the small conscious part of the stream, yet that is necessary for the guidance and direction of the stream through attention.

Consciousness he does not conceive as merely the end and final outgrowth of such a stream of tendencies. To him it is rather a "fact superadded upon the contents of mind and their relations, under certain energy conditions of complexity and intensity." Space and time, as has been suggested, he also makes realities separate from the movements of energy. Both make a real difference to experience and therefore must in themselves be real. Space has an extrinsic relationship to our processes. It gives a neutral background upon which may take place all the varieties of energy movement. It does not interfere with movement but it conditions energy translation. Time on the other hand is intrinsic to these processes, transforming concrete realities, allowing for the change and the constancy which do actually make a difference in our experience.

Both space and time have been artificially considered in serial form for mere convenience and such measurements must not be confused with pure space and time in themselves.

In the same way form is conceived as separately existent yet essential to give value and purpose, to establish any meaning and worth, any direction to the process of evolution and to unite the manifoldness of energy systems. This belongs in the process of evolution yet is not of it, but must be constantly there to give test to processes and results, to form also the ideal by which these processes continue. The author's unceasing watch of this evolutionary activity, of the movement of energy in the unending flux, saves an obscurity that might otherwise arise in regard to the origin of form. His thought conceives it so closely to the process itself, measuring it, valuing it, inspiring it, that for all pragmatic purposes it belongs to his entire working metaphysical concept. Yet here, and as well perhaps in his discussion of consciousness, one feels the presence to some degree of an absolute reference, of some source from which these must arise, which is left too much unexplained.

Nevertheless the book grants the reader on the whole the impression of a practical and comprehensive metaphysics well founded on an energetic conception of reality as it is found and dealt with in actual experience. It furnishes explanation through these concepts of space, time and form, and with the aid of consciousness conceived even thus somewhat apart, for the perplexities and contradictions which experience with reality presents. In doing so it points out and reestablishes for our thought and inspiration the meaning of idealism and its possibility of appropriation for this experience of the now and the future. There is room in such a conceived metaphysics for the partial systems of the past or the imperfect concepts of the present. All are part of the process. And there is recognition also of the change and flux, the depth and extent of impulse and interest that move in individual striving.

JELLIFFE.

THE MYTHOLOGY OF ALL RACES. In Thirteen Volumes. Louis Herbert Gray, A.M., Ph.D., Editor; George Foot Moore, A.M., D.D., LL.D., Consulting Editor. Volume III, Celtic. By John Arnott MacCulloch, Hon.D.D.; Slavic. By Ján Máchal, Ph.D. Boston, Marshall Jones Company.

This volume of the series on mythology is somewhat late in time appearing as it does out of its serial place. The reader will find however that nothing in interest or value has been lost by waiting. The authors of the two parts of the book are to be congratulated on having for their subjects two races in which mythological material has flourished with a peculiar character and has existed down to the present time. At the same time the writers are close to the peoples of whom they write and peculiarly fitted to expound their mythical fancies and beliefs.

Perhaps the editors chose that the particular flavor of Celtic mythology should be reserved for later study. It is true at any rate that compared with the cruder, more remote mythology of other nations, this mythology, particularly among the insular Celts is the very flowery field of such studies, a field still thickly studded with the superstitious beliefs and conceptions whose older more heroic and often ruder form has been gradually recast into the charm and romance of fairy and folk tale lore. Behind this modern dress, however, range the gigantic figures of the past, the greater loves and intrigues and adventurous deeds, the divine regions of the blessed, where even mortals could penetrate sometimes, the intermingling of the human and divine, all of which bespeak the universality of myth formation and the development of these myths along the same pathways as those found elsewhere. MacCulloch has carried his readers behind the present day survival in attenuated form into these more heroic versions of mythological themes and into their relation to the early religion of these peoples. He has pointed out also the existing distinction which meets the student of Celtic mythology on the continent of Europe or upon the British Isles. Legend and tale have been largely swept away in the case of the former or absorbed into the mythology of other races. On the continent the few references in classical writings or the images or scenes of divine life, together with inscriptions containing the names of deities, lead the author to believe in the existence at one time of a rich mythology with a large number of gods. These are not found in Ireland, Wales and north Scotland, but there is there an abundant literature whose foundation is this same mythology. He therefore sums up the situation thus: "Of the gods of the Continental Celts many monuments and no myths; of those of the Insular Celts many myths but no monuments."

In the history of Slavic mythology there is a paucity both of literature and other records. On the one hand the ignorance of Slavic dialects has made the accounts left by outside writers insufficient, confused and untrustworthy. Of the Slavs themselves, on the other hand, there appear to be no written records until a comparatively late date when Christian influence had already influenced their writers to treat but superficially of their ancient religion and mythology. They had moreover already advanced considerably beyond their earlier pagan degree of culture even before the introduction of Christianity. Records can be found nevertheless of their ancient gods and beliefs particularly as regards the Elbe Slavs, and among other divisions of these peoples. The traditions and customs which still survive among the peoples are sufficient testimony of their pagan religion, its form and the characters of their divinities and the hold which these continue to have upon the peoples even under the guise of Christianity. The editor, Dr. Gray, has also added some pages upon Baltic mythology.

The material which this volume presents is therefore rich and varied



and full of a reality of belief and of influence even yet upon the lives of men. Evidences are abundant and striking throughout of the same human conflicts expressed in legendary form, displaced upon gods and heroes, still active in disguise in the vital beliefs of peasant life. These have appeared in other volumes. They come here with a peculiar closeness to life and belief of to-day. Among the Celts they are expressed in the broader narrative, romantic form. Among the Slavs they are found in homely customs, practical religious observances and the like. Christianity has produced less transformation of them here than among the Celtic populations.

The book is just such a treasure house for phantasy interpretation as we have come to expect from these volumes, and the elements at work in phantasy formation of to-day, as found in mental pathology, find even more striking and clear presentation than in myths of a more remote people. The *Œdipus* conflict manifests itself in various ways, as in the dependence of the gods upon human beings, the exaltation of the weaker over the stronger. There are tales of the rebirth or reincarnation of the father in his own son, the child thus impregnating his own mother through some process familiar to myth and to child conception, such as swallowing a grain or some animal form. Other incest phantasies are common, also other well known motives such as shape shifting and invisibility. The symbolism is rich in suggestive meaning in its relation to these recurring themes. The volume is as well worth study as any of its predecessors and its especial charm will bring an added reward.

L. BRINK.

Castro, Aloysio de. TRACTADO DE SEMIOTICA NERVOSA. SEMIOTICA DAS FORMAS EXTERIORES E DAS DESORDENS MOTORAS. Rio de Janeiro, F. Briguier & Cia.

The author of this book has realized the value of utilizing the results of increasing knowledge of the nervous system and its disturbances in a detailed description of the many manifest forms of the latter. More and more knowledge has been gained of the great variety of nervous functioning in relation to sensibility and activity, whether in higher intellectual functioning in secretory or trophic processes or in any other grade of activity and sensation. The complexity and the interrelationship are shown as well in the disturbances of all sorts which are manifest. Increase of knowledge of all these complexities both of function and disturbance has come in every direction, in knowledge of histologic structure, grosser nerve anatomy, relation to specific diseases, heredity, all of which make a fruitful background for presentation of the semiology of the nervous system and prepare the way for promising future study.

On this basis the author outlines very fully, with profuse illustra-

tions, taken from actual clinical experience, the manifestations of nervous disturbances. His first chapter discusses those forms which are externally apparent in more or less permanent alterations of the face, hands and feet or in deformities of other parts of the body. He also includes peculiarities of gait due to such nervous disturbances. He then considers forms of motor disturbance, of which there is great variety and which appear in widely different degree. They may be modifications of muscular tonus resulting in mild contractures or more severe symptomatology or they may be violent convulsive phenomena. Various paralyses are also submitted to detailed discussion, both those which are organic and those which are only functional in their manifestation. Likewise ataxia and vertigo are given special treatment as disorders of coördination of movements and of equilibrium.

The work is a valuable descriptive presentation of these numerous disorders which appear from a variety and a complexity of causes. They have been considered in their practical clinical significance. They represent indeed a wide clinical experience and there is also very full reference to the voluminous literature in describing and interpreting the material presented. While however the ground is so carefully and skillfully covered, one lays down the book with the feeling that the same ground has not been sufficiently broken into. No emphasis is laid upon the psychic interpretation of these things, either in regard to this manifold functioning and interrelationship of the nervous system and the disturbances which arise in connection with it. Surely there is room in such a wide survey for a most practical recognition and application for the sake of interpretation of the dynamic principle which is psychically fundamentally concerned. The amount of descriptive material so ably set forth demands this something more in its fuller practical interpretation, and would thus prove widely illustrative of such an underlying psychic effort, which functions in such varying and too often disturbed manner.

FAY.

## Obituary

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### "THE NATIONAL" AND DR. F. E. BATTEN

Although Langley, Gaskell, Head, Sherrington and other notable British investigators of the nervous system have no associations with "The National," that hospital has long been universally recognized as the temple of British neurology; its staff constitute a priesthood for the spread of the neurological faith of Britain; and towards its small red building, in the dinginess of Queen Square, Bloomsbury, neurologists of all nations reverently incline; for Hughlings Jackson, Gowers, Ferrier, and Horsely labored and taught there. As the present staff consists in nearly equal numbers of Scotch and of English neurologists, "The National" has an almost mathematically British composition. And from it is fittingly absent the chauvinistic tribal spirit which is peculiar to the chief hospitals in London. The men of each of the big London hospitals—St. Bartholomew's, Guy's, St. Mary's, and St. Thomas's—move freely and as equals only among their own. They tend to form separate and exclusive professional constellations, that, subject to the laws of medical gravity, severally pursue distinct paths. As a rule, they move in parallel orbits; and though they may approach and recede from one another, they do not readily intermingle. Thus, round the special hospitals of London, such as the Hospital for Sick Children, Great Ormond Street, certain of these constellations may revolve. A Bart's group may shed its luster on the institution synchronously with, say, a Guy's group. These two groups however will remain associated, in large measure only, in this common function. Hence, when a vacancy occurs, a Bart's luminary, in obedience to natural laws, is attracted by the Bart's group, and repelled by the Guy's; and, *mutatis mutandis*, a Guy's luminary is attracted by his colonizing group and repelled by the Bart's. No such stellar predicaments, however, occur at "The National." For to attain to "National" status requires a concurrence of conditions and circumstances which the stars in their courses seldom ordain. The candidate first must be fitted both by birth and by teaching in profane tradition. Next, a period of careful training in the art of general medicine must be served. Then, the neurological novitiate com-

mences, a time of endless note-taking, of minute researches into morbid tissues, of careful experimenting in nerve physiology, and of routine subordinate service in out-patient departments. If the neurological ambition remains dominant, if these arduous impetuous years be endured and survived, and if death condescend to create a vacancy on the staff, the novice finally achieves the coveted tonsure and is admitted among the elect, where loyalty to his order and to its institution overpowers all lesser medical allegiances. Yet, such allegiances are not only tolerated but encouraged. There is no member of the staff of "The National" who is not also a member of the staff of some other hospital, for it is the duty of the elect constantly to seek clinical knowledge and experience, that they may the more worthily serve "The National"; and it is no less their duty to act as missionaries to the neurological pagans who dwell beyond the confines of Queen Square.

Few more splendidly illustrated this life of "National" ideal and service than Frederick Eustace Batten, whose early death we mourn with his recently afflicted colleagues. Born in Plymouth, in Devon, fifty-two years ago, the son of John W. Batten, Q.C., Dr. Batten was educated at Westminster School, London, and at Trinity College, Cambridge. After securing a second class in the Natural Science Tripos, in 1887, he began his medical training at St. Bartholomew's Hospital. In 1891, he received the degree of Bachelor of Medicine from Cambridge, and was appointed House Physician to Sir William Church at Bart's. Thence he passed to the Hospital for Sick Children, Great Ormond Street, where he served successively as registrar, pathologist, and physician. In 1899 he became pathologist to "The National," and in the following year was made an assistant physician there. He then possessed a thorough training in general medicine, acquired under one of the masters of that day; and he had served a faithful apprenticeship in the keeping of hospital records, and in the study of morbid tissues, before he entered upon his official clinical life at "The National." The result was that Dr. Batten brought to his work a mind trained to precision, habituated to industry, and free from unfounded medical belief. His practical experience as a pathologist led him to look through symptoms to the structural changes which evoked them. If he had a clinical fault it was that the pathologist in him tended to pause at these changes, to regard them as ultimate causes, or to place the origin of morbid changes beyond the scope of his interest. Hence he for a time overstressed the mechanical factors in the causation of poliomyelitis, and he maintained throughout his life an aloofness to psy-

chological phenomena. But he investigated and reinvestigated his cases with scrupulous care and treated them with a therapeutic skill which was conspicuously successful. The death of a patient seemed to produce in him a complex that only a postmortem examination could satisfy. And woe betide the unfortunate interne who culpably failed to procure it or allowed it to take place in Dr. Batten's absence! In winter or summer, wet or fair, day or night, he would submit himself to this tribunal where the dead first appeal against the defeated physician; and he was very seldom adjudged in error either of omission or of commission.

His passion for investigating his cases was seconded by his zeal for note-taking. From his collection of careful notes, he was enabled to classify, with certainty, related cases; hence, he not only recognized and demonstrated new types of disease, but he also established the identity of certain known types which less accurate research had differentiated.

His writings appeared generally in "The Lancet" or in "Brain." In 1897, his famous article on muscle spindles first made him known to neurologists. Three years later, with Drs. James Collier and Risien Russell, he published in "Brain" the classic monograph on subacute combined degeneration of the spinal cord. The same journal, in 1903, contained his study of "The Position of the Head in Cerebellar Disease." In 1908, he discovered with his associates the facial type of myopathy which bears his name. And in his introduction to the discussion of myopathies at the International Medical Congress of 1913, he proved the identity of myotonia congenita with congenital myopathy. Perhaps his chief neurological work lay in the field of poliomyelitis. He made many laborious investigations of myelitis and encephalitis which he recorded from time to time, and which he finally gave to the world in connected form as the Lumleian Lecture on Poliomyelitis which he delivered before the Royal College of Physicians of London in 1916. His last paper dealt with epidemic stupor and was published in collaboration with Dr. Still.

Dr. Batten's days were few but his achievements were many. His life of untiring industry, guided by a purpose constantly, unobtrusively, and faithfully pursued, reveals a spirit of scientific apostleship, a devotion to science and conscience, in keeping with what is rare and best in British genius. This spirit of apostleship appropriately has its home in a hospital called "The National." The traditions of Hughlings Jackson and the other fathers of British neurology are there jealously safeguarded and perpetuated. The suc-

cessors of these fathers spend their days in gathering neurological facts, facts which are the ultimate, unperishable and unexciting product of many piously laborious hours. Symbols and their interpretation are anathema at "The National." The neurologists there live as in a cloister, surrounded by a walled garden, so remote are they from the strife of the conflicting creeds of modern neuropsychology. Neurological modes may change, whimsies, followed to-day, may be lightly discarded or forgotten to-morrow, but the data patiently amassed at "The National" are of the permanent material out of which the science of neurology shall be built.

W. J. M. A. MALONEY

### JOSEPH GRASSET

Grasset was born in Montpellier in the French Midi in 1849 and died at his home there in 1918. The measurement of his life lies not between these dates but in the influence which drew to him the love and respect of those about him and which extended even far beyond these illustrious borders.

He was born of a family already distinguished by its literary interests, its culture and nobility of character, and which had already made itself known in the faculty of medicine of Montpellier. His own work was performed in his native city, where he both received his training and completed his long life of active clinical and literary service. His preliminary work in physics and chemistry already showed some of the qualities which he was to bring later to the service of medicine. He became hospital intern in 1871 and two years later presented his thesis upon diseases of the respiratory tract of malarial origin. At the age of twenty-six he obtained the title of assistant professor in therapeutics in a brilliant trial of words with Dieulafoy, the fame of which has never died away. He became a few years later, in 1881, professor of therapeutics and materia medica and in 1908 professor of general pathology. He had succeeded Professor Dupré in the chair of clinical medicine and had found there a fruitful field in which his talent for observation and his critical knowledge exercised themselves in far more than mere teaching. His students were trained in analytical methods and the spirit of his instruction and practise were disseminated throughout all the French Midi. He became professor of general pathology so that he might have an opportunity to synthesize the principles and the facts which he had garnered in his former work, and to this he





JOSEPH GRASSET



added a survey of the same knowledge and experience gained by his predecessors.

His teaching was always marked by justice, kindness, rare tact, as well as distinguished by the breadth of his interest, his wide knowledge. His criticisms not only arose from his well-informed mind but also were rendered impartial through his sincerity, loyalty and scientific truth. From his earliest days as a teacher his lectures were crowded and greeted with enthusiasm.

His writings have been numerous and marked by the same characteristics as his teachings. They also show a definite progress which bore witness to the growth and broadening of his interests from one stage of medical work to another. All his works reveal his special interest in neurological subjects and in the growth of neurological study. His early work on the state of neurology both before and after the time of Charcot was for a long time a classic authority. This book "*Traité pratique des maladies du système nerveux*" went through four editions, the last edition being prepared with the collaboration of Professor Rauzier. It still is a book that can be read with profit as it emphasizes the functional viewpoint rather than the static, although Grasset's sound anatomical foundations are never lost for a moment. A number of other volumes and briefer writings upon the nervous system have appeared at various times to manifest his interest and his increasing knowledge and experience in this field. His desire to bring his material together in a synthetic manner resulted in his admirable "*Traité de Physiopathologie clinique et Thérapeutique générale*." His interests were also of a philosophical and a biological nature, with a special study of both normal and morbid psychology.

Grasset took an active interest in the effort to improve the medico-legal practices of the French courts. He was very wide in his sympathies and was an intense advocate of the principle of relativity in mental affairs, and an opponent of the absolutism which tends to deform the applications of legal principles and by its rigidity brings about anarchy. In this period of his activities he wrote extensively on the mitigated sentence, on parole systems, on a list of medico-legal topics, which writings were marked by great common sense and humanism. His "*Demi Fous*" was translated by Jelliffe and although making little impression on the rigidism of American procedure, is still a work worth reading and thinking about.

In 1914 he resigned from his professorial work in order to devote himself more completely to the philosophical consideration of his work. He devoted himself to this work until the time of his death,

even through his long illness. It did not, however, prevent him from offering his services to his country and he became in November, 1914, director of the neurological center of the sixteenth region. His noble and kindly spirit was sorely stricken by the sufferings of his countrymen and finally by the death of his youngest son particularly beloved by him, who was killed in the aviation service. He was confined to his bed in September, 1917, and never left it again but continued there the preparation of his last literary work.

His noble and lovable character, his personal and scientific integrity and the character of his services as a busy practitioner as well as a teacher and writer are everywhere recognized. He was an honored member of the Academy of Medicine, the Academy of Sciences, the French Academy, of academies and societies in a number of other cities at home and abroad. Among the special honors received was that of president of the Academy of Sciences and Literature of Montpellier and he was made by the French government chevalier and then officer of the Legion of Honor. His fellow citizens also granted him a seat at the municipal council. A son who survives him, Pierre Grasset, has already reached a distinguished place in literature.

SMITH ELY JELLIFFE.

# The Journal OF Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

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## Original Articles

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### A LESION IN THE PUTAMEN

BY L. NEWMARK

SAN FRANCISCO

In the right putamen of an aged man, with intense sclerosis of the arteries of the brain and cord, a condition was observed which, it is thought, may be interesting because it at least closely resembles, if it is not identical with, that which has been described in the youthful victims of progressive lenticular degeneration.

*History of the Case.*—In September, 1911, a man, aged 65 years, was sent by his doctor, who wrote that the patient had a tremor in his left hand, and that the left side was affected in a manner which suggested the diagnosis of "onset of Parkinson's disease"; the condition had been "coming on this past year," during three months of which the patient had been under the observation of the writer of the letter; and advice was asked regarding treatment which might "prevent the other side from being involved."

The patient himself related that about a year and a half before, he had fallen sick with stomach trouble and had lost weight, but was now better; he was still weak, however. The inefficiency of his left arm was first noticed while shuffling cards one day in the summer of 1910. It had happened on one or two other occasions that he could not articulate, although he knew what he wanted to say. Within the last few months he had noticed a "numbness" in the left arm, and later a tremor; he could not perform habitual movements with the left hand as well as before, and could not move the left toes as well as the right. The left leg was not as strong as the right, but he had

observed no tremor in it. When he shut the left eye, however, he felt a tremor which did not occur when he shut the right. In his youth he had had gonorrhea, and, he thought, "one or two chancres."

There was at first sight nothing striking in the aspect of the man or in his movements or in his mode of speaking. Neither myself nor certain others who observed him with me shared the impression of incipient paralysis agitans. This impression had evidently been caused by an appearance of slight stiffness and clumsiness in the left hand, which was discolored to a reddish hue, and by the tremor. The attitude of the hand was not, however, that of paralysis agitans, and the tremor was not present when the hand was not voluntarily moved. During voluntary movement there was a fine regular tremor, of no considerable severity, quite like an ordinary mild senile tremor. There was no complaint about the right hand; in it only a very slight trembling could be detected when the arm was extended; it was hardly pathological in degree.

Extension and flexion of the left elbow were performed with slightly less power than would have seemed normal. The grip of the left hand was distinctly diminished. In the left lower extremity there was also a slight loss of power: the toes could not be wriggled with quite the same ease as those of the right foot, and flexion of the knee, and dorsiflexion of the ankle were executed with less strength than on the right side. But all other motions were quite forcible.

There was no difference in the radius or elbow reflexes, knee-jerks, heel-jerks, or plantar reflexes, between the two sides. All of these were perfectly normal. Concerning the abdominal and cremaster reflexes there is unfortunately no note.

Sensibility in all its modes was normal throughout; there was no astereognosis, no ataxia, the sense of passive movements and that of posture in the fingers of the left hand was keen. In putting the left forefinger to the nose the patient would remark that this was not done with the same ease as with the other hand, though no difficulty was apparent to the observer. The pupils, optic discs and all the other cranial nerves were unaffected. There were cardiac murmurs, referable to the mitral and aortic valves. The Wassermann reaction in the blood was negative.

Observation of this case was interrupted by intervals of months. In May, 1912, the patient mentioned that he had been wetting the bed of late. It was discovered that there was a large amount of residual urine, in consequence of a paresis of the bladder. The man was instructed in the use of the soft catheter. He reported the next



day that the urine was bloody ; but he was suffering no pain. Cystoscopic examination by a specialist disclosed an area in which the bleeding had taken place. A week later there was no visible evidence of the hemorrhage, and none recurred. There was no hypertrophy of the prostate. The vesical weakness had been followed soon by fecal incontinence. Power over the anal sphincter returned to a considerable extent, but the patient was dependent upon the catheter for the rest of his life.

At this time (May, 1912) the spinal fluid was examined. The Wassermann, Nonne and butyric acid tests gave negative results. Fehling's solution was not reduced. The cells averaged five per cubic mm.; all were lymphocytes. The report added that the fluid contained a shreddy precipitate, which increased on standing.

Through an oversight the patient was allowed to depart without a blood count having been made. The omission was vexatious, and we sought to communicate with him, and with the doctor who had sent him, in order to obtain the information wanted ; but without success. Our belated zeal, however, was not inspired by any suspicion of an abnormal state of the blood. Accordingly, the result of a blood count made immediately after his reappearance in January, 1913, was surprising: there were 600,000 white and 4,750,000 red blood corpuscles, and the Hb was 95 per cent. Of the white corpuscles 90 per cent. were lymphocytes, 5 per cent. large mononuclear and 5 per cent. polymorphonuclear. On another occasion 700,000 white corpuscles were counted. The patient was considered to be afflicted with lymphatic leukemia.

Meanwhile nothing else had changed. The condition of the left extremities was as before. Neither spleen nor liver was enlarged, nor were the lymph glands.

Dr. W. F. Beerman, who attended the patient during the last year of the man's life, states that there was a progressive debility, with occasional delirium ; sometimes the confusion passed off in a few minutes, at other times it lasted several hours, towards the end it continued for several days. There was no other change whatever in the neurological condition from that which has been described. Death occurred February 14, 1914, about three years and a half after the trouble in the left hand was first noticed.

*Anatomical Examination.*—Dr. Beerman performed the autopsy under very inconvenient circumstances ; what he brought away was preserved in formaldehyde. It was about two years later that I first inspected the material, and found the brain, which was uncut, the spinal cord, of which the lower end and most of the cervical part was

missing, the spleen, a kidney, a small piece of the liver, and a bit of a rib. No enlarged glands had been seen at the autopsy. The pia mater, it is said, appeared in the fresh state as if there had been a severe purulent meningitis, an impression caused by the leukemic condition.

The spleen, after the long immersion, was not larger than a normal organ. In it, as well as in the kidney, the rib and the liver there was found on microscopic examination an intense lymphocytic infiltration. In view of the concurrence which has been described of

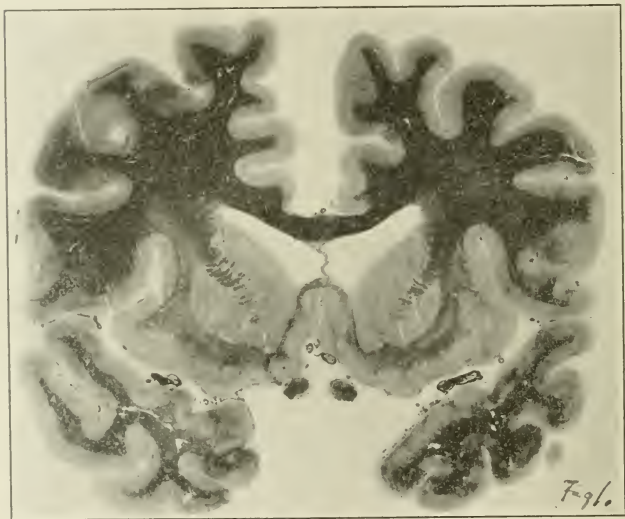


FIG. 1. Coronal section passing through optic nerves. Right putamen slightly smaller than left.

remarkable changes in the liver with disease of the lenticular nucleus it should be emphasized, perhaps, that no other affection was found in the piece of liver than the foci of lymphocytes.

The pia mater could be stripped from the brain without difficulty. A section through the brain in the coronal plane, passing through the lenticular nuclei, disclosed a marked difference in size between them, the right appearing much shrunken.

Large blocks of tissue were kept in bichromate of potassium for several months; this necessitated dependence chiefly on Weigert's

stain for myelin and on the Van Gieson mixture in preparing that part of the material for examination with the microscope.

*Microscopical Examination.*—There is a general arterio-sclerosis throughout the meninges, of long standing and of high degree, dense fibrous thickening of the coats causing narrowing of the lumen, in some of the vessels almost to their total occlusion.

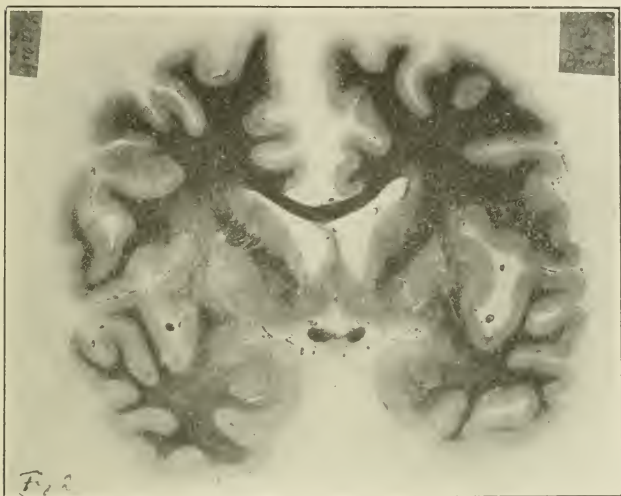


FIG. 2. Section through anterior part of globus pallidus and optic chiasm.

There is a very abundant infiltration of the pia mater with lymphocytes, throughout the length of the cord and about the brain, the congregations of cells being more numerous at the base of the brain than over the convexity, and, in the spinal region at least, around the veins than around the arteries. Occasionally an accumulation of lymphocytes is seen about a vessel within the nerve-roots. The infiltration with the small round cells permeates in many places all the layers of the pia mater, but the substances of the cord or brain appears to be invaded relatively only very slightly, scattered lymphocytes being found here and there in the marginal glia. One gets the impression that the pia has acted as a filter, allowing a comparatively insignificant number of corpuscles to pass through. Where larger foci of round cells are seen an extension of the connective tissue of the pia can generally be traced. The villi of the choroid plexus, the

pineal gland, and the substance of the only intervertebral ganglion which was examined, were also found to have been spared the leukemic infiltration.

The condition revealed by coronal sections through both hemispheres, stained by a modification of Weigert's method, is illustrated by the series of photographs, which were supplied with great liberality by Dr. H. D'Arcy Power. In Figs. 1 to 4 a difference in size between the two hemispheres is discerned. It becomes grad-

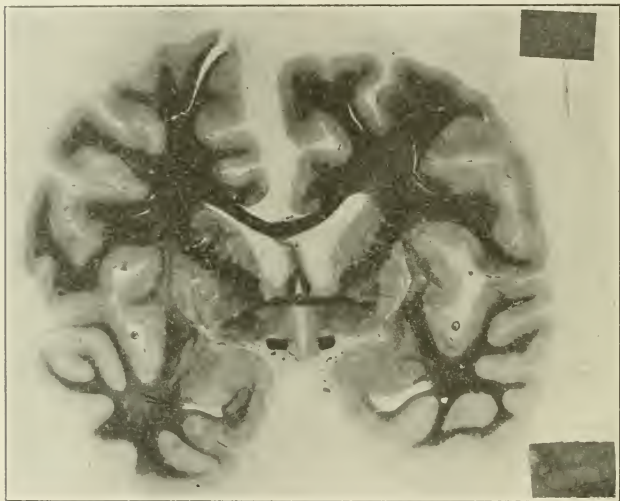


FIG. 3. Diminution of putamen and globus pallidus at level of anterior commissure.

ually clearer, as we proceed from the first to the fourth section that there is a shrinking of the right putamen. At first, a difference in the supply of myelinated fibers in the putamen is not discerned; it is the Van Gieson stain which shows under the microscope the changes in the anterior planes represented in the series. Before the globus pallidus appears, proliferation of neuroglia is detected first in a small area in the lateral part of the putamen, near the external capsule, about midway between the dorsal and the ventral extremity of the putamen. This neuroglia proliferation spreads gradually in a mesial and in a vertical direction as the sections proceed caudalwards. At the level of the median part of the anterior commissure

(Fig. 3) the proliferated neuroglia is still confined to the lateral region of the putamen, where the myelin stain shows the presence of fibers running more or less vertically; some of these are degenerating. The pathological process denoted by the increase of neuroglia has at this level hardly invaded the region of the fibers which radiate towards the globus pallidus, but soon (Fig. 4), before the mesial medullary lamina of the globus pallidus becomes well developed and enables an inner zone of the globus to be distinguished, it becomes evident that the nerve pencils passing towards the lateral

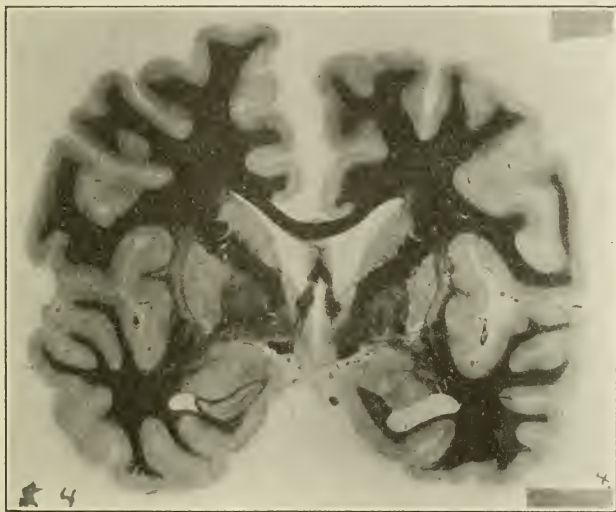


FIG. 4. Shrinking of right putamen and diminution of right globus, but other gross changes in central ganglia not visible.

lamina are not as large as those in the other hemispheres, the finer, pale fibers becoming deficient. The diminution of these fibers can dorso-ventrally; but in the dorsal corner of the globus, in the angle included between the lateral lamina and the internal capsule, the pale, fine, yellowish fibers, which pass between globus and caudate nucleus, are abundant. At this level the proliferated neuroglia occupies an area extending about two thirds of the way across the putamen from the external capsule; dorsally it has slightly encroached upon some of the bridges of gray matter between the fibers of the internal cap-

be traced into the globus pallidus at about its middle third, reckoning sule, and ventrally it has extended not quite to the base of the putamen. Thus far the naked eye perceives in the Weigert sections in the lenticular nucleus nothing more than the shrinking of the putamen, the contraction of which has been almost exclusively in its width, and the slightly smaller size of the right globus pallidus. Radial bundles of fibers can be seen directed towards the external lamina, and the substance of the putamen has not undergone gross changes.



FIG. 5. Cavitation in right putamen.

But about the level of the genu of the internal capsule, at the anterior extremity of the optic thalamus, where the globus pallidus has two distinct zones, and where the lenticular ansa appears (Figs. 5 and 6), the pathological process in the putamen becomes more intense. Not only are the perivascular spaces larger than hitherto, but large spaces have formed through almost the whole vertical extent of the putamen, in consequence of the breaking down, or tearing, of the neuroglia, and of the opening of the spaces thus formed into the large ones around the blood vessels. Around a vessel at the base of the putamen there is a large mass of lymphocytes, but within the putamen itself lymphocytes do not appear in considerable numbers



which might indicate a special affection of this region by the leukemia. The vessels within the affected area are not conspicuously diseased, although some "lacunes" are observed around them; some vessels appear even rather thin-walled. The neuroglia is very rich in nuclei, which, retaining some of the stain after differentiation by the method of Pal, give to the ground substance in the Weigert sections a granular appearance under a lower power; by this appearance the presence of the disease in the putamen may often be detected before the

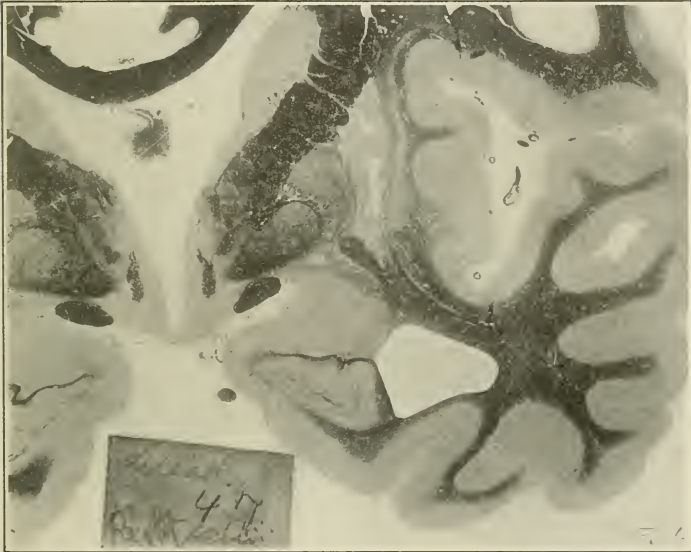


FIG. 6. About same level as in Fig. 6, enlarged. Cavitation. Abundant fibers in lenticular ansa.

loss of myelinated fibers becomes clear. Another indication of the morbid process in Weigert sections is the presence of pigment granules. This pigment is not observed in the left putamen.

Before the appearance of the ansa, as in Fig. 6, there are still a number of fiber bundles in the putamen which contain the paler, finer fibers as well as darker ones; but after this the degeneration of the fibers becomes more extensive and more intense, the finer fibers seeming to disappear first, for what is left of a bundle is always composed of thicker, darkly-stained fibers.



FIG. 7. Section through anterior end of thalamus. Atrophy and degeneration of putamen. Anterior part of Forel's lenticular bundle normal.

The corrosion, or moth-eaten look, of the putamen is striking; but in a carmine or Van Gieson section the disease stands out distinctly even where there is no cavitation. In a large section viewed under a low power the proliferated neuroglia quickly catches the eye.

In the plane of the genu of the internal capsule, where the morbid process has reached its highest degree, there is still a very slight difference in size between the globi pallidi of the two hemispheres, but soon, in the plane passing through the middle of the mamillary tubercles (Fig. 7) it becomes doubtful whether there is still this inequality. The lateral lamina appears thinner on the affected side, chiefly on account of the loss of fibers passing to it from the putamen. Within the lateral zone of the globus the characteristic fibers from the putamen are conspicuously absent; those of similar appearance in the dorsal region of this zone, which pass between the globus and the caudate nucleus through the internal capsule, are as abundant as on the left side. There is a dense network of darkly-stained fibers of varying caliber in each of the two segments of the globus; but one gets the impression that there is a still greater wealth of thick, dark, transverse fibers in the left globus than in the right, even in the mesial segment. Towards the ventral part of the globus, however, there is no visible difference in the supply of myelinated fibers between the mesial segment in the right and that in the left half of the brain. The ansa, ventral to the globus (Figs. 6 and 7), is as well developed on the affected side as on the other, and this is likewise true of the fibers which issue at the dorsal part of the periphery of the mesial zone and pass tangentially to it mesialwards, towards the anterior thalamus (Fig. 6).

The disease in the lenticular nucleus is still intense in the region exhibited in Fig. 9 (the figure is *reversed*). The neuroglia is still breaking down in the lateral part of the putamen in the middle third of its dorso-ventral dimension, and its overgrowth extends here through the whole width of the putamen, approaching close to the globus pallidus. Further caudalwards the tissue ceases to present the moth-eaten aspect. The ventralmost part of the putamen, which turns off laterally at an angle, is normal throughout, even where an increase of neuroglia is observed in all the rest of the putamen. The loss of myelinated fibers in the posterior part of the putamen and in the remnant of the adjoining globus pallidus is manifest (Fig. 10). Thinning and pallor of the external capsule are also noticeable.

Even after the putamen has been split up into islets by retrolenticular fibers, at the level of the external geniculate ganglia, an increase of the glia nuclei continues to distinguish the right putamen from the left, although there is a great lessening in the intensity of the affection.

It should be stated that in the *left* putamen in various planes areas of increased glial nuclei are now and then to be found. In its

caudal portion, at about the level shown in Fig. 10, this increase of glial nuclei is quite diffuse, except in the ventral region.

The projection system of the globus pallidus appears to be normal (Figs. 7 to 10). In Fig. 9, which furnishes a magnified view of the structures exhibited in Fig. 8, Forel's lenticular bundle appears larger on the side of the lesion than on the normal side, while the corpus subthalamicum of Luys is smaller on the former. This is due to a slight obliquity of the sections, the effect of which is still



FIG. 8. Section through posterior limb of internal capsule and cerebral peduncles.

more pronounced in Fig. 10. The normal side is cut further caudalward than the affected side. The right internal capsule, regarded by itself in the successive planes of the series, shows no degeneration. When viewed in comparison with the other, however, a difference is observed between the two sides at the levels represented in Figs. 8, 9 and 10. The right centrum semiovalis appears smaller, the right internal capsule is not quite so broad as the left, and particularly the fibers which descend from the lateral part of the foot of the corona radiata and cut the dorsal corner of the putamen to pass along the lateral edge of the internal capsule, are not so massive on the right side as on the left. The difference between the two internal capsules which is to be seen in Fig. 10 is caused by the obliquity of the section.

In the cerebral peduncles (Figs. 8, 9, 10) and in sections at subsequent levels showing the peduncular bundles descending in the pons, no difference is noted between the two sides either in Weigert or in Van Gieson specimens. The retrolenticular internal capsule appears quite normal; so do the superior cerebellar peduncles.

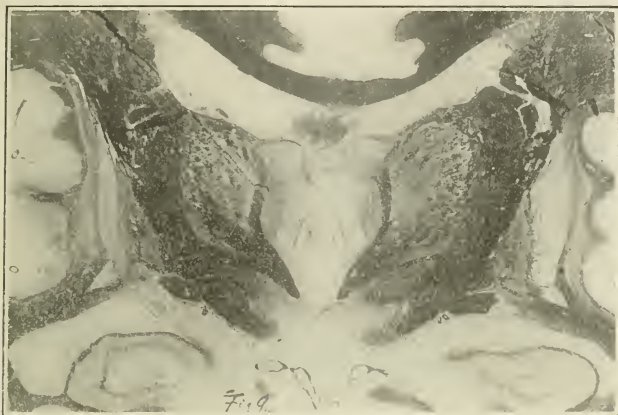


FIG. 9. Part of Fig. 8 enlarged. The picture is *reversed*. Atrophy and degeneration of right putamen; loss of fibers in globus pallidus. Forel's field, Forel's lenticular bundle, cerebral peduncle appear normal. Right internal capsule slightly diminished.

Material from the lowest part of the pons and the upper medulla oblongata was lost, for the most part. A Weigert section passing through the region of the acoustic nerve and cutting the pyramids above the olivary bodies shows a pallor at the ventral tip of one of the pyramids (the side was not marked here), and in another section, likewise unmarked, lower down and involving the olivary bodies, there is an area of altered myelin, extending from the ventral edge of one of the pyramids, just lateral of the arcuate nucleus, a little way dorsalward. Madame Vogt<sup>1</sup> gives photographs of similar pallid areas in this part of the pyramids in her paper on *État Marbré du Corps Strié*; in her case these patches were apparently bilateral, and she gives good reasons for supposing them to be artefacts, noting especially the absence of reaction in the glia. An increase of neuroglia in this case is of the slightest, if it really exists at all.

<sup>1</sup>C. Vogt. *Journal für Neurologie und Psychologie*. Vol. 18, 1912. Plate 43.

Whatever the nature of these patches of altered myelin may be, farther down the *right* pyramid is distinctly, though very slightly, affected in a manner which is likely to have pathological significance (Fig. 11). In sections in which the myelin sheath is stained it is always slightly, but indubitably, lighter than the other pyramid, the degree of difference being about the same in densely stained preparations and in those in which the differentiation has been carried farther or in which the hematoxylin lake was originally less dense; and this may be observed in specimens from various blocks all the



FIG. 10. Section through red nucleus, peduncles and anterior part of pons; section is oblique. Pale areas in centrum semiovale due to insufficient chrome. Degeneration of right putamen and external capsule.

way down to, and through, the motor decussation, and at the lower end of the decussation the lighter stain may be detected in the left crossed pyramidal tract. The difference between the two pyramids is still less marked in sections stained with carmine or with the mixture of picric acid and fuchsin; a keen-eyed pathologist, to whom such a section was submitted, declared himself at first unable to discern the difference, although he had found the evidence of the Weigert stain clear enough. Yet there is an extremely slight increase in the neuroglia in the right pyramid. Most of the cervical cord was either not obtained or was greatly damaged. Sections from its lower



part and from the upper part of the dorsal cord show in the area of the right uncrossed pyramidal tract a loss of myelin and what appears on close comparison with the tissue on the other side to be an extremely slight increase of glia, not detectable otherwise; while in the postero-lateral column on the left the pyramidal area is not at all distinguishable in Weigert sections, but here again comparison with the other side seems to disclose an increase in the neuroglia.



FIG. 11. The paler pyramid is the right.

Below the upper dorsal region no pyramidal affection could be made out.

The manner in which the brain was prepared not having been favorable to the study of cell changes, it only remains to say that such specimens as were obtained indicated that the cells of the putamen could hardly have survived in considerable number, or preserved their function, where the glial proliferation was abundant. The process which originated in the putamen and lead to the changes shown in the illustrations does not seem to have encroached upon the globus pallidus to any marked extent, the loss of myelinated fibers in the latter appearing to be secondary to the affection of the putamen. Accordingly, nerve cells are observed to be present in the globus; whether they have undergone considerable diminution in

number or finer structural changes could not be satisfactorily determined. Near the caudal end of the globus the tissue is rarefied around the blood vessels. The large cells are numerous in the basal ganglia of Meynert on both sides.

### SUMMARY

The gist of the foregoing is that a man, advanced in years, after having experienced a transient disturbance of articulation some time before, suffered a slight impairment in the use of the left extremities, which appeared to him as a "numbness" or awkwardness in the action of the left hand, and a loss of facility in moving the left toes, and was associated with a slight tremor of the left hand on voluntary movement, and of the lid when he shut the left eye. By his first medical attendant the disease was considered, after an observation of three months, to be progressive and, possibly, incipient paralysis agitans. In the remaining two years and a half of the patient's life no further progress in the affection of the extremities was observed; but about a year and a half before his death paralysis of the bladder and weakness of the anal sphincter supervened. There was no Babinski sign of involvement of the pyramidal tracts, and all the tendon reflexes were normal, but the record contains no mention of the abdominal or the cremaster reflex. Subsequently lymphatic leukemia was detected, probably not until it had existed a considerable time, and of this disease the patient died.

Anatomically, leukemic infiltration is found in various organs and in the meninges of the brain and the cord; the arteries supplying the central nervous system are profoundly sclerosed; in the lenticular nucleus of the right hemisphere the putamen is shrunken, its contraction being almost exclusively in the lateral dimension, many of its nerve fibers are degenerated, and its area occupied by a mass of neuroglia with abundant nuclei, the changes taking place in this neuroglia leading to an appearance of corrosion or cavitation of the putamen, while the putamen of the other hemisphere shows only comparatively slight proliferation of the glia nuclei. The caudate nucleus of either side is unaffected. The right globus pallidus is hardly more than secondarily involved, through the loss of fibers which pass between the putamen and it. The myelinated fibers of the striothalamic and striohypothalamic systems have suffered no appreciable diminution. Finally, a slight degeneration in the right pyramid appears in the medulla oblongata and is traced faintly into the upper dorsal cord.

The lesion in the putamen resembles in so many particulars what Wilson<sup>2</sup> has described in his well-known paper on progressive lenticular degeneration that his words might have been transferred and found quite apposite to the condition before us; this applies even to the blood vessels for the most part, their relative thinness, for instance, despite the intense sclerosis of the arteries so widely prevailing.

One will not be easily dissuaded from associating this degeneration and shrinking of the putamen somehow with the arterial disease in this case, and may assume that there is here from this cause an effect which elsewhere may arise from other causes. Such cases as van Woerkom's,<sup>3</sup> however, must be borne in mind, where, in a man of 65 years, there was advanced atrophy in the central ganglia with degeneration of nerve fibers and proliferation of neuroglia, yet the blood vessels were considered to be in very good condition for a person at that time of life. Even for the "lacunes" of the aged, with their sclerotic vessels, Marie,<sup>4</sup> who found them most frequently situated in the putamen, is impelled to inquire, in view of the pronounced dilatation of the perivascular spaces, whether it may not be a sort of "vaginalite destructive" that affects the tissue as if by a progressive corrosion: the sclerosis of the vessels did not seem to suffice by itself, for in the area of the morbid change the vessels were quite pervious and contained blood corpuscles. Whether it be arterio-sclerosis or "destructive vaginalitis," the anatomical effect in the case before us presents a striking likeness to that which is so regularly observed under the very different conditions of Wilson's disease. Unfortunately nothing is known concerning the time of onset of the leukemia, so that it would be vain to speculate regarding an influence possibly exerted by that disease upon the putamen.

The paralysis of the bladder and the rectum may have been caused by a leukemic focus in the lower part of the sacral cord, which could not be examined anatomically; but if the leukemia had involved the spinal pia at the time the paralysis occurred, it is surprising that the spinal fluid contained so small a number of lymphocytes. The painlessness of the lesion which caused the hemorrhage of the bladder and the insensibility to the large amount of residual urine would seem to indicate that the origin of this paralysis was rather in the cord than in the corpus striatum, to demonstrate the in-

<sup>2</sup> S. A. K. Wilson. *Brain*, Vol. 34, 1912, p. 295.

<sup>3</sup> Van Woerkom. *Troubles des Mouvements actifs dans la Lésion du Corps Strié. Nouvelle Iconographie de la Salpêtrière*, Vol. 27, 1914-15, p. 273.

<sup>4</sup> P. Marie. *Des Foyers Lacunaires de Désintégration*, *Revue de Médecine*, 1901, XXI, p. 281.

fluence of which upon the bladder a number of observations have been published.

As for the tremor and the very slight hemiparesis, constituting a clinical picture which suggested paralysis agitans to at least one mind, support may be found therein for Wilson's theory of a "steadying effect" exercised by the corpus striatum on the action of the cortico-spinal system, the slightness of the syndrome being conceived as due to the integrity of the projection system of the globus pallidus, while the actual symptoms may be ascribed to the partial withdrawal of some influence which the putamen normally exercises upon the globus pallidus through the internuncial fibers, in this instance found to be degenerated to a considerable extent. Whatever this influence may be, one may suppose it, on anatomical grounds, to have been partially maintained by fibers passing from the caudate nucleus to the globus pallidus. Objections to this reasoning may be based on negative clinical observations and on the negative results of experiments on animals, the latter having been supplied by Wilson<sup>5</sup> himself. Those who hold with the late Professor Dejerine<sup>6</sup> that nowadays the lenticular nucleus is tending to become a sort of "caput mortuum," in which the attempt is made to localize the lesions of different affections with a more or less variable symptomatology, have here a slight, and rather obscure, affection of the cortico-spinal tract with which they may account for these symptoms.

<sup>5</sup> S. A. K. Wilson. *Anatomy and Physiology of the Corpus Striatum*. Brain, Vol. 36, 1914.

<sup>6</sup> J. Dejerine. Discussion in *Revue Neurologique*, 1914, Vol. 27, p. 726.

# THE WAR TRAUMAS OF THE SPINAL CORD<sup>1</sup>

## SOME CLINICAL FEATURES

BY L. GRIMBERG,

CAPTAIN, M. C., U. S. A.

### I

The present study is an analysis of 37 cases of spinal cord traumas, as they appear immediate after, or a very short time after, the injury is received. Though the number of cases is limited, still they present practically every variety which can be met. It was not my intention to go into details of scientific discussion, nor to tabulate the immense bibliography on the subject; still various problems are here and there raised, various theories touched upon, but only inasmuch as they bear relationship to our analysis.

Primarily, this study is a clinical study, discussing the question as it presents itself at the bed-side. In one word, I had in mind the clinical phase of the subject. The material is from the Neurological Department of the American Red Cross Military Hospital No. 1, and I must mention here that the clinical material was worked out by Captain G. E. Price, Captain H. O. Feiss, Captain H. Unterberg, Lieutenant Williamson, Lieutenant Wm. B. Terhune and myself. Through their efforts this paper was made possible.

For the purpose of facilitating the analysis of our cases I divided them in seven groups, as follows:

1. Cervical Cord .....	4
2. Dorsal Cord .....	7
3. Lumbar Cord .....	12
4. Cauda Equina .....	4
5. Concussions .....	2
6. Sympathetic Plexus .....	1
7. Roots:	
(a) Cervical .....	4
(b) Lumbar .....	2
(c) Sacral .....	1
Total .....	37

As can be seen from the table, I included in the list the lesion of the sympathetic plexus and the root injuries. Indeed, the plexus

<sup>1</sup> From the Neurological Department of the American Red Cross Military Hospital No. 1, American Expeditionary Forces. Authority to publish granted, Board of Publication, S. G. O., November 26, 1918, 700.7.

and the roots are so intimately connected with the cord in war traumas, that they must be studied together.

I did not follow the classification given by French authors in upper and lower cords or superior and inferior. This is indeed justified in the cervical cords where such two distinct types could be found. The upper cervical, from 2-4 and the lower 5-8. Injuries to the superior are very serious and when complete sections are present, they are fatal. Injuries to the inferior cervical cord are oftentimes serious and, when complete sections, are frequently fatal.

From the pathological standpoint, as well as from the clinical, we distinguish two kinds of histories:

1. Complete sections <sup>2</sup> .....	9
2. Incomplete sections .....	15
Total .....	24

Each class is clinically and pathologically different and it is of paramount importance to distinguish them.

One very important observation made in studying our cases is that an injury to the cord alone does not exist. It is known that, even in laboratory practice, it is very difficult to produce a complete section of the cord alone. Of course it is theoretically possible and more or less successful sections can be obtained in the laboratory. But in traumas there will always be an injury to the roots.

## II

In one word *a spinal cord trauma must be conceived as a root and spinal cord injury*. That not only on account of the course of the roots which become more and more parallel to the cord as we go down, but also on account of their intimate relation with the cord itself (see diagram 1).

In the cervical cord lesions there is also to be considered the intimate relation between the cord and the sympathetic plexus. Frequently the injury is of both and the Dejerine-Klumpke ocular syndrome is found.

It is in the cervical cord traumas that the Brown-Séquard type of paralysis is met. These injuries are very severe and when the respiratory and pulse anomalies are present they proved fatal.

Another group of cases which stood out as *per se* are the injuries to the cauda equina, not on account of their severity, but on account of the clinical phase.

<sup>2</sup> By complete section it is also understood a transverse myelitis, which is really the frequent pathological process.



In analyzing our material we frequently met what we thought were anomalies in the course of the disease. A paralysis cleared up in a few days and from the severe condition in which the patient was in, we found a slight improving monoplegia. Such occurrences

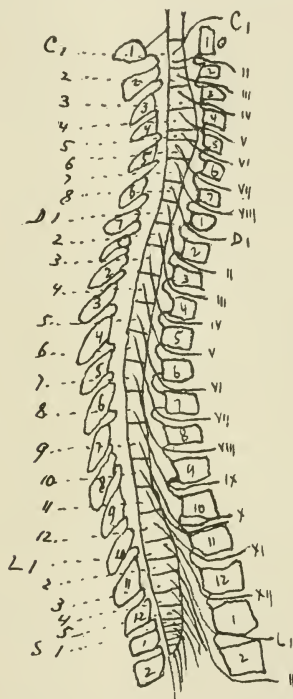


FIG. 1. Showing the relation between spinous process, cord segment and course of roots. (After Dejerine.)

are not very rare. What seemed to us to be an anomaly at the beginning, proved after a short while to be a rather common occurrence, and it had an explanation in a well established pathological process. It was the question of concussion, edema and hemorrhage. It was a very interesting phase in the clinical aspect of a case and I thought to deal with it in a separate paragraph.

## III

*Reflexes.*—The study of reflexes in cases of spinal cord injury is of paramount importance, not only for diagnostic purposes alone, but also prognostic. Still, of the number of reflexes which can be tested, I have found that only some of them are of real diagnostic purposes, namely, among the deep reflexes the patellar and ankle and among the superficial reflexes the epigastric, abdominal, cremasteric and plantar reflexes. In war neurology when time as a rule is limited and when the patient's condition is to be considered, as well as for the scientific correctness, I believe that the above enumerated are the only important ones.

1. *Deep Reflexes.*—In a complete section of the spinal cord, for example, we have the reflex arc broken at a certain level. We have a destruction of the afferent and the efferent paths, of the anterior horn cells, etc. We would therefore expect an absence of the tendon reflex. In one word all the elements making up the reflex arc would be broken under such circumstances.

On the other hand, we may have a lesion of some of the elements forming the arc, as in incomplete sections. The posterior horn cells may be injured or the anterior horn cells alone, or the descending portion of the reflex arc. In such cases the reflexes will also be absent or diminished.

This rule finds exceptions in lesions of the upper cervical cord, where the pyramidal tracts are injured. We have then a disequilibrium between the controlling power of the motor paths—central neurons—and the anterior horn cells, and the result will be increased reflexes.

It would appear, though the anomalies are present, if a reflex arc is broken at a certain level, the question which caused discussion is why the reflexes below that point of lesion are lost. Shuster, of Berlin, thought some years ago that a degeneration is taking place downwards as well as upwards in the spinal cord. But his theory was based upon the study of tumors in the spinal cord and not on war traumas. So far the question is still unanswered.

In reviewing our material we found that all the patients with complete sections of the spinal cord had all the deep reflexes abolished below the segment injured. (Regarding cervical segments see above.)

Patients with incomplete sections showed what might have been thought to be irregularities. For example, one patient had the patellar reflex absent at first, then a few days later it was present. The reason for this apparent anomaly I found in the clearing up of

a congestive or hemorrhagic condition in the spinal cord. As a matter of fact, in this patient the paralysis, sensory disturbances, and all the other symptoms improved at the same time. Such conditions may also be explained to a state of "shock" in which the patient is immediately after the injury.

As a whole our cases showed conditions which were clinically correct.

Two case histories offer, regarding reflexes, an unusual interest. One was an incomplete section of last cervical and the other of the seventh cervical. The last one presented increased tendon reflexes, but no Babinski. It is a fact which in the general clinical aspect of the case could not be explained. Still, since then, this had been noted a few times, the Babinski sign appearing later in the course of the disease.

The first case is more interesting. He had all the reflexes of the upper extremities gone and a flaccid paralysis. The epigastric and abdominal reflexes were absent on the right, but present on the left. The cremasterics were absent on both sides. Then he had a double Babinski, but no spastic paralysis of the lower extremities and no increased tendon reflexes of the lower extremities. This approaches to what is found in compression of the enlargement of the cervical cord. In such conditions we usually find a double lesion: of the "central motor neuron" for the legs and of the "peripheral motor neuron" of the upper extremities. Clinically we have a flaccid paralysis of the upper extremities and loss of tendon reflexes and a spastic paralysis of the lower extremities with increased reflexes and Babinski. Somewhat similar action probably took place in our patient's cervical cord, but the injury not being serious enough to affect deeply the "central motor neuron," on the other hand affecting seriously the roots supplying the arms and also the posterior cells. As a matter of fact, the residual paralysis of our patient after some time was a flaccid paralysis of the right arm, dissociated in type.

*2. Superficial Reflexes.*—The important superficial reflexes in spinal cord injuries are the epigastrics, abdominals, cremasterics and plantar. The plantar reflex is probably more important, and really only then very important, when it is abnormal, producing the Babinski sign. Otherwise, I believe, it has not much importance, for in functional condition like hysteria and in war neurosis, I have found it frequently absent.

What was said about the deep reflexes above is also true of the superficial or cutaneous reflexes, and they play just as important a rôle in localization of spinal cord injuries as the deep reflexes.

In analyzing our material I have found that the reflexes having their center below the injured segment were occasionally present or frequently sluggish. That in complete sections. For example, one patient with a complete section of the seventh dorsal had absent deep reflexes, absent epigastrics and abdominals, but sluggish reacting cremasterics. Out of our nine cases with complete sections and having the lesions, two the dorsal segments and seven the lumbar segments, therefore above, at and below the cremasterics reflex center ( $L_1-L_2$ ), three patients had a sluggish reflex and six absent. We found that the cremasterics were the last to disappear and the abdominals the first. Just why this irregularity took place, I cannot say, but that was a clinical fact.

The same we observed in the incomplete sections. This reflex was frequently sluggish, often present, then when the entire clinical picture was such that its absence was supposed. On the other, from our cases, when they were found absent, against the contention of some authors, they remained absent and did not return after a short time; as long as the lesion was unchanged.

3. *Control of Bladder and Rectum.*—In connection with the question of reflexes, we may also consider that of incontinence or retention of urine and feces. We found that incontinence is met more frequently than retention. There where retention of urine was present for a few days, incontinence took its place after. We observed this in two cases out of nine in the complete sections. Only one patient suffered from retention all the time he was in the hospital. The reflex emptying of the bladder was noticed in many patients suffering from retention when the bladder was overfilled. Some of these patients were aware of the dribbling of the urine, but were unable to control it.

Incontinence of feces was the rule, and that might be due to the diarrhea which frequently set in.

4. *Plantar Reflexes.*—In spinal cord injuries the important plantar reflex is the Babinski sign. Its presence was always taken as evidence of an injury to the pyramidal tracts, in one word an injury affecting the relation between brain and horn cells. It will be due to a break in that relation that increased reflexes will be present and also the Babinski sign.

In the analysis of our cases we laid much stress upon the existence or absence of it with following results:

Complete Sections.	No. of Cases.	Present.	Absent.
1. Dorsal cord.....	2	0	2
2. Lumbar cord.....	7	1	6

Just why in that one case, when clinically we had evidence of complete section of the cord at the level of the first lumbar should present a Babinski sign, I cannot explain. As a matter of fact the sign disappeared after a few days. It is possible that we really dealt with a pseudo-Babinski, or probably a defense reflex. The condition of the patient was very serious and the examination was done fifteen days after the injury was received.

On the other hand the absence of the sign was not always accompanied by the presence of the normal toe reflex. No relation could be found that whenever one is absent the other must be present.<sup>3</sup>

In the incomplete sections of the spinal cord we had the following results

Incomplete Sections,	No. of Cases,	Present,	Absent.
1. Cervical .....	4	1	3
2. Dorsal .....	5	2	2
3. Lumbar .....	3	0	3

All these patients had increased reflexes and showed evidences of involvement of the upper motor segments. In spite of these facts, I could not associate myself to the opinion that an absence of the Babinski sign is evidence of a complete section and the presence of a Babinski sign of an incomplete section. Neither can I agree to the opinion that its absence or presence throws light upon the severity of the spinal cord lesion. It is my opinion that the Babinski sign has its importance as a localizing factor of the injury and as evidence of pyramidal tract involvement.

#### IV. SENSIBILITY

1. *Subjective*.—From a review of our cases, it appears that subjective sensations are not very rare. Roussy and Lhermitte contend that this is not frequently the case.

As a rule, the patient complains of numbness in the paralyzed extremity. They will often say: "The legs feel like dead," but on inquiry it is brought out that a sensation of numbness is meant by that. I will leave open the question as to the cause of it, for it may be a condition of fatigue, as some authors believe, or on account of injured or irritated roots as I believe.

A frequent complaint is that of tingling, which is often annoying

<sup>3</sup> Cf. G. Roussy and J. Lhermitte, *Blessure de la moëlle et de la Queue de Cheval*, p. 10.

to the patient. Case M. H., quoted later in this chapter, complained of it. The tingling sensation was present in the paralyzed and non-paralyzed arm and disappeared as soon as the sensory disturbances—*anesthesia*—appeared. In that particular case, I will say that we probably had initially edema and subsequently actual degeneration of the posterior horn cells, as the *anesthesia* appeared later in the disease, corresponding to the arm in which residual sensory changes and paralysis set in, whereas on the other arm, which recovered, the edema disappeared and the irritation subsided in the posterior horn cells, without degeneration process setting in.

Regarding the sensation of numbness and “dead-like feeling,” I found it noted in 12 cases out of our 37. It was the first sensation the patient perceived, the first sign to bring to the patient attention that he is paralyzed, and it appeared immediately after the injury was received. This sensation persisted some time in the course of the disease, until definite sensory disturbances, what I would call *residual*, are established.

Other patients complained of shooting pains, very severe, in the legs, the arms. The pains are like “in the bones.” It reminds one of tabetic pains, though they are not as severe. Five patients gave such a history. One patient, F.A., was wounded by a shell splinter which entered the neck at the base and went out on the left side. Immediately after receiving the injury, he found that he was unable to raise the right arm and “had severe shooting pains in the right hand.”

Another patient, with an injury of the cervical cord, had pains referred to the left shoulder and arm. Still another patient, with a transverse lesion of the eleventh dorsal segment, complained of “occasional shock-like pains in both limbs, chiefly the left, and cramp-like sensation in the right foot.” A patient with an incomplete injury of the third lumbar segment, had great pain in his legs.

Therefore out of our 37 cases, 17 have noted in their histories subjective sensory complaints. All except two were incomplete sections of the spinal cord, and all except two showed marked improvement in the course of time. At least that is the conclusion which could be drawn from an analysis of our case histories.

2. *Anesthesia, etc.*—In the diagnosis and localization of spinal cord injuries, the sensory changes are of the greatest importance. Still, this is a difference between the sensory changes due to a diseased condition of the cord and the war traumas. A diseased condition may appear in the cord itself and affect some segments or parts of segments. It will have its ascending or descending course. It



is a degenerative process of the cord substance, giving rise to various disease entities always presenting the same aspect and having definite objective and subjective symptoms. The sensory disturbances have a characteristic appearance and determine the localization in a definite segment.

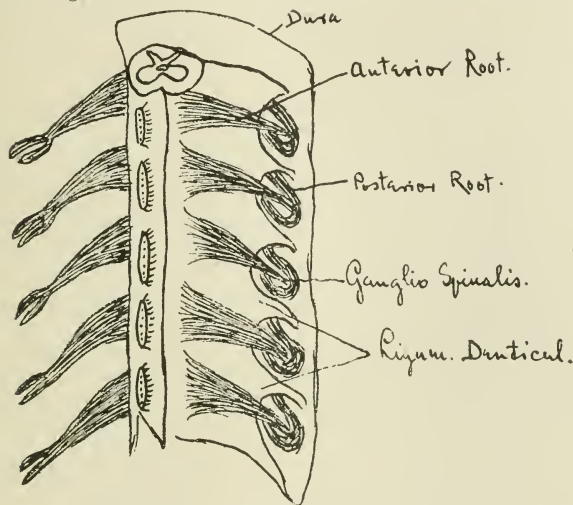


FIG. 2. Showing the relation of root and cord in the dural sac.  
(After Gasser.)

In war traumas of the cord we deal with extraneous agents. A shrapnel splinter or a bullet is transmitted to the cord from the outside. It will pass bone and tissue and break it. It will tear vessels and produce hemorrhages and will tear the cord substance and eventually set up a disease process. The break and tear does not necessarily have to be limited to a segment or part of a segment, neither to the cord alone. It encounters plexuses, roots and dura and then damages the cord itself.

It is on account of the damage done to the roots that the sensory disturbances do not always correspond to the cord segment injured (compare diagrams 1 and 2), the same as muscles may be paralyzed which do not correspond to the cord segment.

A very important factor is also the clearing up of zones of anesthesia. This condition is frequently met in war traumas and it is due to the existence of hemorrhages and edema. That clearing up is often met in Brown-Séquard syndromes.

From these remarks it can be seen that though the sensory disturbances are among the most important diagnostic aids, by themselves they cannot be taken as conclusive.

I will here briefly report some of our histories, for the purpose of elucidating these remarks.

CASE 1. Patient N.V., No. 6528, admitted with the diagnosis "gun shot wound at head, non-penetrating. G.S.W. right side of neck with fracture of spinous processes of the third cervical vertebra. Partial right hemiplegia."

On the examination the patient showed a right side paralysis. The right lower extremity was completely paralyzed. He was able to bend his knee a little and flex dorsally his foot. Left arm apparently well. He had the Dejerine-Klumpke ocular syndrome on account of the involvement of the cervical sympathetic. Diminished knee reflex right, present left. He had absent epigastrics, abdominal and cremasteric reflex on the right, present on the left. The sensory disturbances showed blunting (hypoesthesia) on the well side, commencing with the region supplied by the fourth servical cord segment. On the paralyzed side he had hyperesthesia, commencing with the region supplied by the sixth cervical (see diagram 3). It was therefore a typical Brown-Séquard syndrome, with definite areas of hypo- and hyperesthesia, when I examined him.

On the second examination, undertaken by First Lieutenant Terhune one week after and on my own examination the following day, he still presented the Brown-Séquard syndrome, but great changes took place. The right leg showed a positive Babinski and ankle clonus. The anesthetic area shifted down to the sixth dorsal segment, though the hyperesthetic area remained the fourth cervical. The paralysis steadily diminished. He had a glove anesthesia right hand, which was less pronounced following day. The muscles supplied by the radial were not anesthetic now (see diagram 4).

In one word, we noticed in this case not only an improvement in the sensory disturbances, but also in the paralysis, reflexes and general condition of the patient. I attribute this change to the disappearance of edema and absorption of hemorrhages in the cord.

CASE 2. Patient M.H., No. 2078, was wounded by a bullet in the cervical region, through and through wound. Neurological examination, made by Captain Unterberg, showed following results, among other findings: The right arm and hand were puffy, left hand and arm normal. Absolutely no movement in right arm and hand. Motion in left hand lost, some movements in left biceps. All other movements gone. Upper cervicals intact. Had tingling sensation in both arms most of the time.

Decubitus on the right elbow. All reflexes of upper extremities gone. Middle and lowed abdominals on left present. Upper and all on the right absent. Right leg everted. Left leg in normal position. Knee jerks exaggerated, right more than left. Right leg weak from some flexion. Double Babinski, more pronounced on

the right. No clonus. Sensory: Hyperesthetic on right leg. Hyperesthetic on left leg. Heat and cold in left leg reversed, on the right normal.

This case is also a Brown-Séquard syndrome, though not typical. It presents at the same time a dissociated paralysis and somewhat dissociated sensory disturbances.

Three weeks later another examination is undertaken by First Lieutenant A. H. Williamson, with following findings:

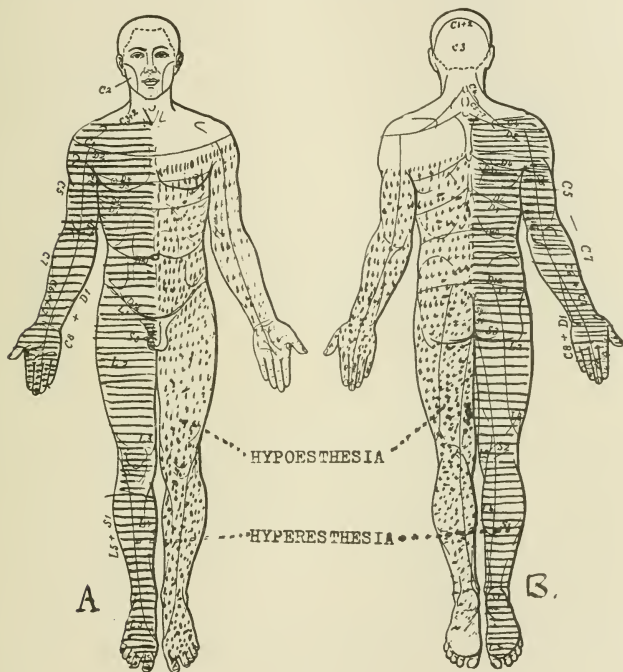


FIG. 3. Patient N. V. showing change of sensory disturbances within a short time.

Klumpke-Dejerine ocular syndrome on the right. The right shoulder was depressed. Was able to bring arm forward and backward. These movements were definitely present and about one fourth of the normal range of movement. No other motion in the right arm. Sensory disturbances showed anesthesia to pin point over dorsal surface of hand and half of forearm, radial side. The same distribution on the palmar surface (see diagrams 5 and 6).

The left arm showed all movements preserved. Feeble movements with thumb. The fingers were not flexed and only weakly extended. Flattering abduction of the fingers. No sensory changes.

The legs showed the right stronger than the left, reflexes more active than normal. No Babinski and no clonus. No sensory changes.

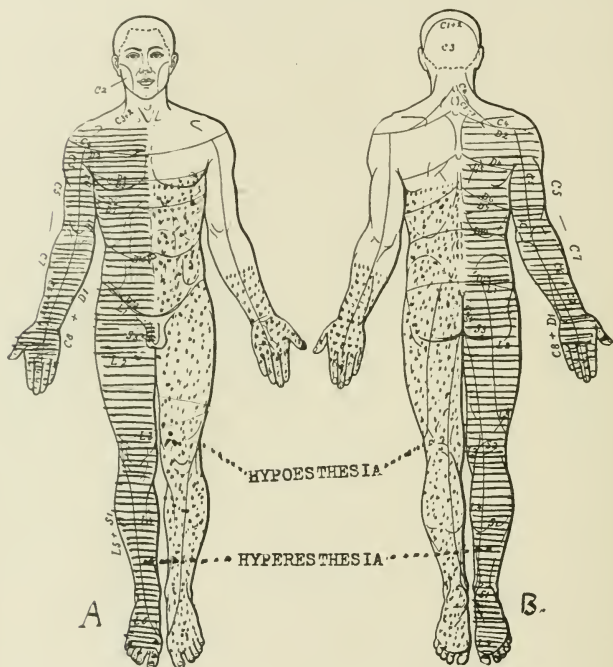


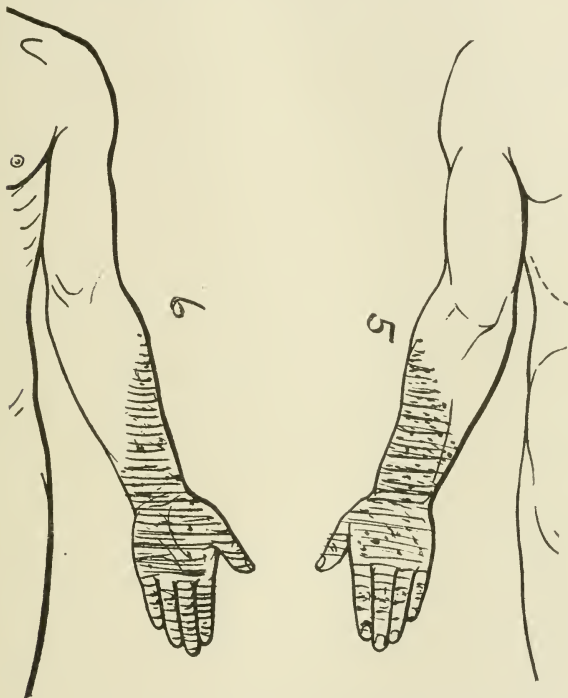
FIG. 4. Patient N. V. showing change of sensory disturbances within a short time.

From the observations drawn in this case is to be noted the marked change in the entire condition of the patient and the great shifting of the sensory disturbances.

*Conclusion.*—From the above remarks and from the analysis of the cases, it appears to me that following conclusions can be drawn:

1. Edema of the cord is frequent in war traumas and is responsible for sensory disturbances of a great extent.

2. The edema may disappear without causing through its pressure on the posterior horn cells degeneration, and,
3. That the disappearance of it is responsible for the disappearance of zones of anesthesia, etc.



FIGS. 5 and 6. Showing residual sensory changes in patient M. H.

#### V. CONCUSSION

We had only two cases of genuine concussion of the spine. One patient had a visible trauma and the other no trauma at all. According to other observers concussion of the spine is not so rare as reported and according to clinical observation they run a course *sui generis*, entirely different from any other condition. They should, therefore, be classed clinically as a separate condition.

The chief distinguishing point is the evolution of the cases.

From a condition of quadriplegia, for example, we see in the course of a short time a monoplegia resulting. The dangerous state in which the patient was immediately after the injury, disappeared, and from a diagnosis of complete section of the spinal cord, with a fatal prognosis, we must change it into a simple concussion. The final result of these cases is, most of the time, a degeneration process in some part or another of the spinal cord, but far out of proportion to the initial appearance.

Other cases clear up completely and no residual paralysis ensues.

Clinically, therefore, the diagnosis of the concussion of the spine cannot be made until a short time after the injury, the period of time depending upon the severity.

I will review here the history of our two patients, presenting both types described above.

Patient G. P., No. 5175, examined by Captain H. O. Feiss. He was wounded by machine gun bullet. The exact circumstances could not be ascertained. He had one wound to the left and one to the right of the cervical spine, about the fourth and fifth spinous processes. He noted at once the paralysis of all limbs.

Two days after the first examination his condition changed. He could make every motion, but very slowly. Bladder and rectum were normal. The reflexes, which at the beginning were absent, were now present except the abdominals. He had a pseudo-Babinski. The sensory disturbances disappeared.

The second patient under my own observation presented the following picture:

Patient J.G., while riding on the top of a train, was knocked down when the train pulled under a bridge. Was unconscious for two hours. Examination showed: right pupil larger than the left. Left myosis and pronounced nystagmus.

Weakness of the right side of the body, but also the left leg.

Reflexes showed absent patellar on the right and very sluggish on the left. Babinski on the left.

The blow was given to about the fifth cervical vertebra.

The second examination the following day showed normal pupils and all the reflexes were present. No weakness. Patient was walking around and was discharged from the hospital.

In both cases the diagnosis at the first examination was of an actual trauma to the spinal cord with destruction of tissue. The course of the disease in the following few days showed the true condition.

## VI. CONCLUSIONS

It was my intention to point out in this short report some of the clinical features under which war traumas of the spinal cord present



themselves. It is by no means an exhaustive study, even far from being complete. However, it is my contention that through this study I emphasized two points:

1. That an injury to the cord alone does not exist. In one word, that a trauma to the spinal cord must be conceived as a root and cord trauma.

2. That injuries (war traumas) of the spinal cord are nearly all the time associated with edema or hemorrhages, which may clear up in the course of the disease and change the entire clinical picture.

## THE BLOOD UREA NITROGEN IN CATATONIA

BY W. C. RAPPEYE, M.D.

PATHOLOGIST, FOXBORO (MASS.) STATE HOSPITAL

The striking clinical picture of the mute, apathetic and semi-stuporous phases of catatonia as seen in the catatonic form of dementia præcox suggests a definite metabolic derangement at least associated with the mental picture. The physical phenomena of lowered blood pressure, slow heart action, peripheral stasis as evidenced by the cold, clammy and cyanosed extremities, dermatographism, lowered body temperature, slow, shallow respirations, the polycythemia (probably associated with the peripheral stasis), the lethargy, sluggishness of response and semistuporous attitude, the constipation and generally lowered muscular tone point to depressed vital activity. The features are, of course, not strictly applicable to the excited states seen in this form of dementia præcox.

An inquiry into this condition has been begun and the present is a report of the blood urea nitrogen findings in a small group of cases. A number of similar determinations were made on other patients of approximately the same age and living on the same diet, to serve as controls. The determinations were made by the Marshall urease method, the blood being drawn in each instance before breakfast, about twelve hours after the preceding meal. Five cubic centimeters of blood were used for each determination.

The values as given below show a distinct drop in the blood urea nitrogen when the patient goes into catatonia, the figure in several cases being about 50 per cent. or less of the normal values (considered as ranging from 9.0 to 15.0 mgm. per 100 c.c. of blood). The marked drop in the values occurs rapidly and early in the development of evidence of the catatonic state. In several instances in which the determinations were made within a few hours after the onset of signs of the condition, the blood urea nitrogen had already dropped considerably. Several of the patients have been under observation for about eight months and their blood has been studied quite frequently.

All of the patients studied have been rather mild cases, all took the house diet voluntarily and in approximately normal amounts,

thus eliminating in large measure the factor of diet. Urine examinations were made at various intervals and none of the cases showed any evidences of renal process. To further control the kidney factor, the rate of elimination of phenolsulphonephthalein was ascertained in a few cases, as far as practical in various stages of the catatonia. In no case was the dye excretion abnormal (ranging from 55 per cent. to 65 per cent.). It has been possible in several instances to secure the urea values before, during and after the catatonic state on patients who have continued to eat throughout and it has been interesting to note the return of the urea values to normal, concomitant with the return of more normal physical and mental findings.

The significance of this finding is not at once apparent. The possibility of it being the result of a lowered protein intake has been largely controlled by the selection of only patients who continued to eat during the study and by parallel determinations of the blood urea nitrogen of other patients living on the same diet and in whom there was no reason to suspect abnormal metabolism. By using blood drawn so long after the preceding meal, the factor of diet is further eliminated, though the blood urea is but little influenced by diet if the kidneys are normal. The drop in the urea values also occurs too promptly after the first evidence of the catatonic state to be accounted for by any slight decrease in protein intake that might have occurred. An incomplete protein absorption from the intestinal tract suggests itself also. The findings of abnormal nitrogenous substances in the stools of patients suffering from dementia præcox suggests some support to this possibility. But there seems to be no reason for assuming any degree of absorption malfunction apart from the general features of the disease, and the abnormal protein substances in the stools are probably attributable to hydrolytic processes associated with the intestinal stasis. The possibility of the low figures being due to renal stimulation and rapid elimination of urea has been considered but nothing to indicate that feature is evident.

An association of this phenomenon with the evident metabolic upset seems justifiable and logical. The finding as an evidence of an endocrinopathy is to be considered. But it seems more reasonable to assume it as a measure of lowered endogenous metabolism, probably closely associated with the hypotonic state of the vasomotor system. It would then fit into the clinical picture of periph-

eral stasis, slow cardiac and respiratory activity, constipation, low blood pressure, etc.

In favor of this assumption is the fact that measures taken to increase vasomotor tone, when successful, frequently bring recovery to normal condition. For example, patient "A" has had regular periods of typical catatonia for several years, but since he has been put at manual work, he has not had another period, though the present time interval has been at least three times as long as previous periods free from catatonic manifestations. The presumption being that the manual labor has tended to maintain good vasomotor and muscular tone. The improvement in patients in general when placed at work is a common observation and is probably due in part to some such improvement in general tonus. The findings of low blood chloride (which have been made on some of these patients also) in cases of dementia præcox and the improvement following intravenous saline solution as reported by several Japanese and American investigators may be a similar response, in which the intravenous saline tends to elevate the blood pressure, especially the diastolic figure which in these cases is relatively lower than the systolic.

An attempt to consider the finding of a low blood urea nitrogen in this condition as a feature of a hypotonic vasomotor system is not inconsistent with a disturbance of one of the endocrine glands or systems, for the vasomotor phenomena may well be evidences of such a disturbance. But a theoretical discussion of the inter-relation of the endocrine glands, the autonomic nervous system, cardiovascular system and metabolism is not the purpose of the present communication.

#### SUMMARY

The blood urea nitrogen values show a marked and prompt drop when the patient enters into the apathetic and semi-stuporous phases of catatonic as seen in the catatonic form of dementia præcox—the figures being about 50 per cent. or less of the normal values which are considered as ranging from 9.0 to 15.0 mgm. per 100 c.c. of blood.

Studies were made only on patients who ate during the period. As a further control of the factors of diet, parallel determinations were made on the blood of other patients on the same diet and ward routine. In all cases, the blood was drawn before breakfast about twelve hours after the preceding meal.

The phenomenon is considered as a feature of deranged nitro-

genous metabolism probably associated with the hypotonic vasomotor system (as shown by the low blood pressure, slow pulse, slow, shallow respiration, the peripheral stasis and cyanosis, the lowered muscular tone, etc.) rather than more direct evidence of an endocrinopathy, to which, however, the cardiovascular findings may possibly be attributed. That the phenomenon may be associated with lowered protein intake or absorption, or a result of renal stimulation has been considered but seems unlikely since in the study, these factors have been controlled as far as practical.

The figures follow:

## BLOOD UREA NITROGEN (MGM. PER 100 C.C.).

Patient A			Patient B			Normals
June	22	11.7				10.1
	23	10.9				12.3
	25	* 5.0 5.0	(25)	14.0 15.2		2.5
	29	S 4.2 5.0	(28)	10.4		9.65
July	3	* 5.6	(3)	* 4.5		19.27
	7	* 5.0 4.5	(10)	* 5.6		14.0
	10	* 4.5	(12)	* 7.3		11.2
	15	* 5.6 5.6	(15)	* 5.6		9.5
	17	* 7.3 7.3	(18)	* 7.3 5.4		11.2
	25	* 8.4	(21)	* 5.0 7.3		12.3
	31	12.3 11.2	(31)	* 8.7		14.0
Aug.	2	* 7.3 7.8		8.4		15.7
	5	* 5.6	(4)	9.2 10.6		12.3
	5	* 9.0	(10)	10.6		9.5
	9	* 9.0				14.6
	10	* 7.3				12.9
	18	* 5.0				9.0
	20	10.9				11.2
	26	12.0				13.4
Sept.	4	14.6 15.7	(7)	12.3		
	6	8.4				
	10	10.1				
	13	11.2	(13)	11.2		
	20	9.0 9.5				
Oct.	7	10.1 9.5	(7)	12.3		
	18	12.0 12.0	(10)	11.2		
	23	10.1 9.0	(18)	9.5		
	25	11.2				
	27	10.6	(26)	12.9		
	30	15.7				
	31	12.9				
Nov.	3	* 7.8				
	12	* 9.5	(14)	16.8		
	20	15.0				
	27	14.0				
	30	12.3				
Dec.	2	16.2	(2)	14.0		
	15	11.2	(8)	13.4		
Jan.	5	12.8	(20)	14.5		
	18	12.3	(4)	16.2		
Feb.	5	15.7				
	20	14.0				
Mar.			(15)	14.6 15.1		

## Other Patients

C.	June 22	12.7	F.	* 4.5
	July 9	* 7.8		10.6
	14	* 5.6	G.	* 7.8
	21	* 7.8		* 8.1
	22	10.0	H.	10.6
	23	9.5		* 6.4
	25	11.2	I.	* 5.6
D.		* 6.7		* 6.2
E.		* 4.5	J.	* 5.6
		* 5.6		8.4
		* 8.4	K.	* 7.3
		9.2		* 7.8
				* 6.2

\* In catatonia.



## Society Proceedings

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### BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

MEETING OF MAY 16, 1918

DR. CHARLES G. DEWEY, President, in the Chair

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#### DEGENERATIVE CHOREA (HUNTINGTON'S TYPE) WITH THE SEROLOGY OF GENERAL PARESIS

Dr. Lowrey reported on two cases, one with autopsy, in which examinations revealed the laboratory findings characteristic of general paresis. In neither case, however, could the diagnosis of Huntington's chorea be made, for in neither instance was there a family history of chorea associated with dementia coming on in adult life. These cases did resemble Huntington's chorea clinically nevertheless.

Typical Huntington's chorea cases do not show spinal fluid changes nor a definite pathology, though the basal ganglia have been under suspicion as the locus of the disease. The occurrence of choreic movements in paresis is well known but little emphasized and various observers have called attention to the association of chorea with syphilis, making the examination of the spinal fluid in all cases to be desired.

The first case was that of a woman who was admitted to the Danvers Hospital at the age of 28, excited, talkative, frightened and suffering from auditory and visual hallucinations. The diagnosis of acute mania was made. At 32 there developed choreic movements of the left arm, peculiar grimaces, speech defect and dementia was progressing. Over a period of 15 years the clinical picture was that of degenerative chorea and it was merely by accident that the serology of paresis was discovered. Even then, there were no clear cut evidence of paresis. Death was caused by arteriosclerosis and bronchopneumonia. The brain showed absence of the fornix, the structures in the wall of the third ventricle were much eroded and there was considerable internal hydrocephalus. The basal ganglia were small but not otherwise especially noteworthy. The posterior and descending horns of the lateral ventricles were partially filled with a gelatinous gray material suggesting gummatous exudate. Pathological changes were widespread—infiltrative meningitis, gliosis, satellitosis, degeneration, exudation and a striking thickness of the vessel walls, with hyaline degeneration—suggesting a mixed vascular and paretic picture.

The second case was that of a woman of 68 who had been brought to the Psychopathic Hospital because of depression and periods of excitement. A number of the relatives were insane or otherwise abnormal. Her husband died of general paresis. She had always been worried to excess but did not show real depression. Four years ago the patient had an attack of pertussis from which she had an incomplete recovery. There has been some twitching of the face, later she became slovenly and unclean. She became restless; there was constant movement of the hands. Depression for six months preceded her observation at the hospital. A mental examination at the time of admission was very unsatisfactory; she was deluded, excited, showed poor memory, etc. The physical examination was essentially negative, except for ptosis, a strabismus, irregular pupils which failed to react, twitching of the muscles of the face and fingers, positive Romberg, active knee jerks, and an unsteady gait. Blood Wassermann was negative on several examinations but the spinal fluid showed all the findings characteristic of general paresis.

In conclusion, Dr. Lowrey called attention to the value of making examinations of the spinal fluid for neurosyphilis in all cases where there might be a possibility of syphilis. The rarity of choreic paresis was spoken of and the good possibilities of treatment.

### FEEBLEMINDEDNESS IN PSYCHOPATHIC PERSONALITIES

Dr. Sandoz reported on the analysis of 50 cases of delinquents sent from various sources to the Boston Psychopathic Hospital for study. He believes that all the cases fit well into a single composite picture from which the individuals differ only in minor details, but that all of them properly belong to one group and should have the same diagnosis.

He found in his study of the group that the heredity was very bad, 100 per cent. when blood relatives are considered. In 90 per cent. of the cases, bad heredity was found in the parents themselves, consisting of alcoholism (56 per cent. of the cases), "nervous symptoms," marked moral or intellectual inferiority, etc. The whole offspring from the same stock was inferior, 49 per cent. of the children of the parents of the girls are feeble-minded, delinquents or abnormal characters.

The major part of the cases had had environment though 13 had good environment. Most of the children had come under the care of social agencies between the ages of 10 and 16. Dr. Sandoz felt that there could be no claim for relationship between the environment and behavior in this group.

The medical history of the girls was essentially negative, only three had positive Wassermann's, in these, the spinal fluid was normal. The mental and behavioristic histories, however, showed remarkable uni-

formity. From childhood, these girls had been stubborn, deceitful, saucy, troublesome, slack and at other times cheerful, kindhearted, gentle and lovable, in different moods. Usually they began delinquencies early, generally before 10, their misdeeds following much the same line of truancy, stealing, stubbornness, etc., as well as sexual offences.

The common bond between their different symptoms is the more or less sudden changes of emotional tone, a dysphoria of the epileptoid character. The reader emphasizes the difficulty of making a diagnosis in such cases, in whom the question of psychosis is seldom raised. The tendency is to look upon environmental features as explaining the anomalies of behavior, but a study of a group like this forces one to the conclusion that there is a deep seated anomaly in their constitution, and to this very group Kraepelin has given the term "Psychopathic Personality." Instead of calling them all so, however, some 33 per cent. are found to grade below normal on the mental tests and the diagnosis of feeble-mindedness is made, much as this plan is to be deplored.

There is no correlation between the severity of the case and the determined mental age. Feeble-mindedness on the other hand does not imply marked disturbances in the emotional and volitional fields, and a number of these girls are supernormal mentally. Dr. Sandoz made the point that the same diagnosis should be given to all these cases because they present identical features despite the fact that a part of them are mentally low grade. The anomaly of character is the important thing. He suggested that a differentiation should be made between those who are feeble-minded and have practically normal character, those who are emotionally inferior but have normal intelligence and those who are inferior in both fields, attempting to secure better recognition of the differences between psychopathic personalities and feeble-mindedness as well as their very close inter-relationships.

### MONO-SYMPTOMATIC DIAGNOSIS

Dr. Philip C. Knapp presented a paper on this subject, calling attention to the undue importance usually given at the onset to new discoveries in diagnosis and investigation, quoting as an illustration the frequency with which the presence of albumin in the urine is looked upon as having a great significance. In addition to the over-valuation of certain symptoms, there is a tendency to lay too much stress upon a single symptom or group of symptoms with too little regard for less evident symptoms. He illustrated this by speaking of the tendency to look upon an exaggerated emotional state as functional in many cases in which the underlying cause may be some organic disease of the nervous system. Also the insistence on having in a given case the one symptom regarded as necessary for the diagnosis was deprecated.

The rarity of pathognomonic symptoms, if any exist, was mentioned and the need of a grasp of the whole clinical picture in arriving at an

opinion was emphasized, the speaker remarking that judgment based upon a single symptom or single clinical method invariably leads to disaster. He spoke of how certain methods of examination were adopted and others of equal value disregarded, the uncommon use of the ophthalmoscope and the common use of the sphygmomanometer for example, or the mental manifestations in a given case are ignored though the spinal fluid examination is insisted upon. An examination of the heart and lungs is always done, but the reflex responses are frequently overlooked.

Even when dealing with symptoms which are familiar, errors may arise from considering them too exclusively, without regard to the history or general condition of the patient. Variation in the normal physical signs of the heart, lungs or kidneys, for example, while requiring careful investigation, should not be ascribed a significance except as they fit into the entire picture.

Dr. Knapp spoke of a case coming to the hospital for immediate operation, showing severe pain and a mass in the lower abdomen, careful examination, however, revealing immobile pupils, absent knee-jerks, areas of hyperesthesia, etc., evidently a frank case of tabes with a crisis. He spoke of another less fortunate case in which a man with recurrent similar attacks had been operated upon three times before the diagnosis of tabes was made. Another illustration was that of a young girl who fell and injured her head. She presented symptoms which seemed typical for hysteria and that diagnosis was made. Ophthalmoscopic examination, however, revealed double optic neuritis and a diagnosis was made of thalamic tumor, and this was confirmed at post-mortem examination.

The errors in diagnosis are made not only by the clinician but by the laboratory workers as well, who feel that their specialized type of work admits of no error or who disregard the clinical evidence. Frequently the clinical man himself is misled by the report of the laboratory worker, sometimes because of his own ignorance of the significance of certain laboratory findings.

The great value of laboratory work in syphilis, especially in syphilis of the nervous system, was emphasized, both in the matter of diagnosis and in the study of the effects of treatment. Still, the Wassermann reaction has its limitations, for other conditions may yield a positive reaction and some cases of frank syphilis may give a negative finding. Here again, the consideration of the finding merely as one part of the evidence was emphasized.

The great value of examination of the cerebrospinal fluid was commented upon, leading frequently to a positive diagnosis in itself. The speaker felt that a diagnosis so made, however, might be open to question, since to date there has not been collected enough data to be sure that every spinal fluid showing the findings considered as indicative of general paresis, for example, can always be considered as meaning that general paresis is either present or developing. Whenever the findings

are made, it probably means that syphilis has affected the nervous system but it does not follow that paresis will ensue, basing an opinion on the laboratory data only. Not enough spinal fluids have been followed through to be sure that such findings are pathognomonic.

A certain number of patients present themselves with spinal fluid findings indicative of general paresis but who show mental symptoms not of the type of paresis. While it is true that paresis may present any symptom of mental disorder, still there are cases of admitted syphilis with positive fluid findings of paresis which, in their entire development and course, are not cases of paresis at all. The reader mentioned a case which he had of a man who had suffered from typical psychasthenia from childhood and who later contracted syphilis and finally showed the spinal fluid findings of paresis. Yet he could not be considered a case of paresis at present since the symptoms were in no way altered from those present before the infection, though it can not be said that paresis may not develop later. He spoke of other cases whose spinal fluid findings were positive for neurosyphilis but who showed typical features of manic-depressive psychosis, such as the cases reported by Barrett.

Another disease in which errors are not uncommon when diagnosis is made from the spinal fluid is poliomyelitis. While there probably is an increase in the cells in the fluid in this disease, especially early, and the diagnosis in the abortive or non-paralytic stage may rest largely upon this finding, nevertheless, the usual source of error in diagnosis of the disease is found in the too complete reliance placed on this one source of evidence.

Lumbar puncture should be resorted to only in the presence of definite indications for there is always the possibility of starting up a meningitis or some other disturbance, though the element of risk is slight. The infrequency of doing lumbar punctures because of these possibilities may explain in part the limited knowledge which we have relative to the spinal fluid in different diseases. The increased cell count in the fluid, especially when found during an epidemic of poliomyelitis, is suggestive of the disease but it may be due to syphilis or tuberculous meningitis.

Though the symptomatology of mental disease differs from that of internal medicine, the recent advances in methods and recognition of symptoms have done much to render diagnosis more satisfactory and exact. The general medical profession still is, however, ignorant of many of the terms and methods used in psychiatry. Dr. Knapp deplored the fact that the profession is uninformed in the symptoms and diagnosis of these diseases, especially in the borderline diseases. He said that many studies are made by psychologists and social workers, whose training could hardly be considered sufficient to pass judgment in matters of mental disease. He emphasized strongly the fallacy of depending upon the various mental tests in making a diagnosis of feeble-mindedness, rather than considering the tests as adjuncts to other methods.

In speaking of errors in diagnosis in psychoanalysis, Dr. Knapp said that it would be difficult to point out such errors as the methods employed are so vague and unstable. The great significance attached to dreams may have some foundation in fact, but the methods used for their investigation and the method of determining the significance of various features found therein could hardly be considered as above question. The authority by which significance is attached to various symbols is not evident.

In closing, the speaker emphasized the necessity of taking into consideration the case as a whole, including a careful history and a careful consideration of the symptoms presented, before offering a diagnosis. Every source of information should be exhausted before a definite opinion should be given.

## PHILADELPHIA NEUROLOGICAL SOCIETY

STATED MEETING HELD MARCH 27

### HEMIANOPSIA

Dr. F. X. Dercum presented this patient, a man, 67 years of age, who came to him for treatment also suffering from a diverticulum of the esophagus. While under observation he became aware rather suddenly of loss of vision in the right visual field of each eye, without other accompanying symptoms. The blood-pressure was high and the superficial vessels were tortuous and resistant. The Wassermann reaction was negative and there were no visible changes in the fundus oculi. Under treatment with potassium iodide gradual improvement was taking place in vision. The conclusion was reached that there had been a temporary occlusion of the blood-supply to the cuneus on the left side of the brain.

### TREMOR FOLLOWING WOUNDS INFLICTED IN THE RUSSO-JAPANESE WAR

Dr. Dercum also presented this patient, a married tailor, 36 years old, who had received multiple injuries while serving as a soldier in the Russian army in 1905. Since that time he has exhibited tremor in different parts of his body, in addition to a subjective sense of tremor at times without objective manifestation.

### TUMOR OF THE BRAIN

Dr. Alfred Gordon presented this case. The patient was a man, 29 years old, who illustrated, among other things, the extraordinary tol-



erance of the brain to surgical operation. Some three or four years before he had suffered from severe headache, with vomiting and attacks of fainting. On one occasion he fell on the street and was taken to a hospital, where a trephine opening was made in the right parietal region. No lesion was discovered, but great relief from the previous symptoms followed. However, left hemiplegia developed, with convulsions confined to the left upper extremity, sometimes with, other times without, loss of consciousness. In the course of time a considerable hernia cerebri developed and headache returned. At this time a Wassermann reaction yielded a negative response, and papilledema was found in each eye. In the hope of affording relief of a segment of skull was removed from the left parietal region with relief from the headache. However, transitory weakness on the right side of the body, with temporary aphasia, appeared, while bilateral optic atrophy developed together with paralysis of the left external rectus and the right internal rectus and there was a tendency to fall toward the right side. With recurrence of the headache, and having in mind the possibility of a cerebellar lesion, a subtentorial occipital operation was performed and again with temporary relief from the distressing symptoms. Finally the headache again became intolerable and hernia cerebri becoming pronounced on the right side the opening on that side of the skull was enlarged. The patient still exhibits weakness on the left side of the body with occasional convulsive seizures confined to the left upper extremity, preservation of tactile sensibility in the left hand, but with astereognosis and loss of sense of position in this member, and optic atrophy; but otherwise he is in good health. The belief was expressed that the underlying condition is a slowly developing new growth in the right fronto-parietal region.

#### INTRAUTERINE POLIOMYELITIS (?)

Dr. Charles S. Potts presented this case, which occurred in a man, 54 years old, who from birth exhibited muscular and bony deficiencies and deformities in different parts of the body with electrical changes, and whose origin was attributed to an attack of poliomyelitis during intrauterine existence or perhaps to developmental aberrations.



## Critical Digest and Review

### WAR NEUROSES AND PSYCHONEUROSES

BY DRs. CHARLES ROCKWELL PAYNE AND SMITH ELY JELLIFFE

*(Continued from page 57)*

Campbell goes on to say, that "the action of the heart in such a critical situation cannot be understood under the simple categories of internal medicine; the internist is thus confronted with the problems of the instincts and the emotions. This is no unique situation in internal medicine; chorea, exophthalmic goiter and diabetes have already brought up the same situation." We have already touched upon this phase of the situation in this critical review.

"The psychopathologist," says Campbell, "comes to the same problem from the other side; dealing with disorders, which are maladaptations of the personality, he finds that in many cases heart symptoms are prominent. He meets these symptoms in states of morbid anxiety, and in various forms of psychoneurotic invalidism. In the anxiety neurosis the whole symptomatology may be dominated by cardiac symptoms; pseudo-anginous attacks are familiar. There is good reason to look for an explanation of these attacks in conflicting trends of high emotional value or in the actual sex life of the patient.

"Even though these complex factors may be the basis of the tension in the patient's life, and of the resultant neurosis, there remains the problem why in one patient the symptoms are cardiac, in another respiratory, for example, asthmatic episodes, and in a third, gastrointestinal. The psychopathologist, analyzing the complex interplay of forces which make up the patient's adjustment to his environment, that is, his behavior, asks the internist what are the physiologic conditions that make an emotional strain hit one man's heart and another man's stomach. Has the former patient a special type of inferiority of the cardiovascular system, quite independent of instinctive or emotional demands, or are the cardiac symptoms altogether dependent on an unsatisfactory instinctive or emotional life, or in some cases are both factors involved, on the one hand a cardio-

vascular system constitutionally oversensitive or of low resistance, and on the other, an instinctive or emotional life that involves a good deal of tension?"

We have already called attention in this digest to this problem and have pointed to Adler's study on "Organ Inferiority and its Psychical Compensation" as one of the sincere efforts which have been made to break away from traditional pathology and to get into the dynamic attitude.

Campbell then raises the question of idiosyncrasy.

Idiosyncrasy, says Campbell, as to the type, degree and duration of emotional reaction is a factor to be kept in mind.

"The difference in type may be illustrated by the fact that one man is struck dumb by a situation that causes the knees of his fellow to give way; the difference in degree is shown by the fact that the man is struck actually dumb by a situation that affects others only with a mild inhibition of speech, although in common language we use the same descriptive term 'struck dumb' (compare the word 'stupendous'). Most of us soon recover normal control of our limbs after a terrifying experience, but in some the loss of utilization of the limbs may last for weeks or months. Thus functional aphonia and paraplegia are not adequately explained by a mere reference to the situation, the precipitating and the present fostering situation (safety, luxury, laziness, glory), but require some study of the personality in which they have developed.

"The same factors have to be considered in dealing with symptoms belonging to the sphere of the vegetative nervous system. The organ that is specially responsive, the degree to which the organ is affected and the duration of the disturbance may vary from individual to individual.

"The persistence of cardiac symptoms after a terrifying experience may well be due to a constitutional idiosyncrasy or acquired inferiority, owing to which the regulating mechanism of the heart takes considerable time to regain its equilibrium or never does regain it.

"The very important general principle must be referred to, that every experience tends to modify the later reaction of the organism; after an infection the patient may be left with increased immunity or in an anaphylactic condition, liable to succumb to an apparently trivial invasion; the individual may be sensitized so that he reacts with special intensity to very small doses of a foreign substance. The same acquired sensitiveness is seen in relation to more complex stimuli; the soldier who has been unnerved by his

experience of high explosives may find later that he reacts with extreme sensitiveness to abrupt noises, and in this reaction cardiac symptoms may predominate.

"A private, aged 20, enlisted at the beginning of the war and went through severe training without symptoms; just before going into the trenches he felt unable to hike, and on his first experience of shell fire he was quite unnerved. At each period of firing his heart would flutter, his knees give way, and he had to sit down; he was sent to the rear. At various hospitals the diagnosis of serious heart disease was made, and he felt that he was doomed. On the voyage home, two shots were fired; the patient was so sensitized that he was unnerved for the day; it started the heart pains, and he could not sit down but moved about. At U. S. General Hospital No. 9, the physical status was: 'Heart normal in size, left border inside nipple line. Sounds perfectly normal. Soft cardio-respiratory murmur in pulmonic area.' It was noticed that the patient was dyspneic under the mildest series of drill exercises for the cardiac cases.

"The complexity of the problem of many heart cases is well illustrated by this history. The first indication of trouble was an inability to hike shortly before his company was due to enter the trenches; the next factor was the terrifying bombardment, to which the patient reacted more poorly than his comrades, although nothing in his previous history had indicated that he was less stable than the average; the next factor to consider is that he was stamped with the diagnosis of 'heart disease,' and carried with him all the time the feeling that he might last only six months, in fact, might drop dead at any moment. On this account he never went out alone, haunted by the fear of a catastrophe.

"Other factors may also be of some moment, if not in this case, at least in similar cases. The patient had deliberately enlisted, he was willing to do his duty, and officially wished to return to France; but beneath his official attitude was a strong emotional undercurrent of a different nature; he had been glad to get back from 'that awful country,' old and dilapidated and unintelligible, for which he said he 'would not give 15 cents.'

"The patient was easily startled, had been upset by target practice on the ship, and reacted vividly if a door was banged. Such reactions are intelligible because the stimulus reproduces in kind if not in degree the original upsetting stimulus. In other cases the stimulus produces a reaction which is not merely excessive, but which seems to bear no intrinsic relationship to the stimulus; the stimulus may derive its value altogether from its previous association with

important emotional experiences, even though the memory of the latter has been more or less repressed from consciousness. Anything that tends to reactivate the memory of the initial painful experience may have a disturbing influence on the vegetative nervous system, without consciousness necessarily being aware of it.

"A case similar to the one just discussed was that of a private, aged 20, who had gone through hard training in France, falling out only a few times. After exposure to high explosives he became very nervous, reacted vividly to every explosion, felt weak in the knees, and his heart fluttered. He was slightly gassed, was diagnosed as having 'tonsillitis and bronchitis,' and later 'heart trouble.' On the voyage home he reacted excessively to some target practice. At U. S. Army General Hospital No. 9, his case was diagnosed as 'effort syndrome.'

"These two cases bring up the question of the relationship of similar heart cases to cases of war neuroses (the term 'shell shock' should be strictly tabued; scientifically it is of no value, and practically it gives the soldiers a wrong attitude toward exposure to shell fire, and its results). Do patients like the two mentioned above have a latent cardiac inferiority, not elicited by the tests of peace nor by the ordinary mechanical demands on the heart, but elicited by the severe emotional demands of the field, while in the war neuroses the patients have other types of sensitiveness, their weak spot lying in the motor system or elsewhere? With this conception, two factors have to be studied in each case: 1. What is the intimate mechanism of the cardiac inferiority? 2. What are the more complex factors, emotional and situational, that precipitate and foster the symptoms."

The term "constitutional inferiority," says Campbell, is vague and without definite connotation; for that very reason it may be used to denote a very heterogeneous group of persons who have perhaps only the one factor in common that biologically they do not have from the start the necessary stuff for a satisfactory response to the demands of the environment.

Campbell then considers various types of constitutional inferiority. Such inferiority shows itself in three types.

"1. An inferiority manifested in prolonged physical invalidism, with little or no definite intelligence defect.

"2. An inferiority in which defective intelligence is a prominent factor.

"3. An inferiority in which the instinctive and emotional life is of poor quality, while the intelligence is fair.

"As to the constitution, or innate equipment of the individual, that can be estimated partly by a study of the stock from which he has sprung and partly by a study of his early reactions to the tests of life, before training and experience have come to play a preponderant rôle.

"One will pay special attention to the presence in the family tree of acute and chronic psychoses, epilepsy, migraine headache, alcoholism or similar maladaptation, hysterical manifestations, invalid type of reaction, eccentric disposition, and mental defect (from the point of view of intelligence, of emotional stability, or of balanced output of energy).

"The early reactions that are suggestive of a special sensitiveness or neurotic instability, especially if they are very frequent and exist in combination, are night terrors (pavor), bed wetting (enuresis nocturna), somnambulism, chorea (a rather heterogeneous group in which toxic and constitutional neurotic factors have to be carefully disentangled), convulsions (tetany, epilepsy), tantrums and exaggerated emotional reactions.

"In addition to the nervous stability of the patient one wishes to estimate his general level of efficiency, and to note any serious variation from the average. The level of intelligence may be estimated by the school record, the wage-earning capacity, and the answers to standard questions on general information. Whether the patient has shown any special abnormalities in his emotional life or in his general activity will be found by reviewing his behavior to his comrades, his interests, his reactions, his steadiness at work, and his responsiveness to standards of honesty, truth and decency.

"There is a tendency to emphasize the type of constitutional inferiority which shows itself in subnormal intelligence, and to overlook those cases in which the intelligence is adequate but the patient may be perhaps unstable, volatile and superficial; or overactive, enterprising, but lacking in judgment; or unaggressive and timid, lapsing easily into invalidism; or intelligent, and efficient in many ways but not responsive to important moral standards. To formulate the various ways in which an individual may be subnormal in virtue of a defective innate equipment would be an elaborate task; the foregoing remarks merely illustrate the method of estimating the quality of the patient's whole machinery for reacting to the environment."

The key to some disorders, Campbell writes, can never be found so long as the physician confines himself to the study of the patient, no matter how intensive that study may be. The headache,

backache, weakness, insomnia, timidity, etc., that may follow a railway accident sometimes disappear rapidly when compensation is given in the form of a lump sum, instead of a weekly pension lasting as long as the disability. The change in the method of compensation does not alter directly the joints or other structures of the body; it creates a different situation. It creates a situation that stimulates effort, replacing a situation that puts a premium on feelings of weakness and discomfort. Many forms of invalidism, although deplored by the patient, still have their own gain, bring in certain immunities or privileges, and enable one to maintain one's self-respect, to secure sympathy, and to postpone the necessity for grappling vigorously with the actual difficulties of life.

"In estimating the degree of disability caused by cardiovascular symptoms, one must consider them in relation to the whole situation, must see whether they play a rôle in the subconscious adaptation of the patient, and must find whether the situation can be altered so that anything that tends to foster the symptoms is eliminated, and everything that can stimulate the healthy activity of the patient may be utilized.

"The military situation is obviously an extremely important factor; the physician tries to stimulate the aggressive, healthy trends of the patient, when as a matter of fact the restoration of health leads to the trenches and the toil of war, for which the patient has a deep-seated repugnance, however nobly he may deliberately accept his share in the unwelcome tasks. His conscious, official self is loyal to his civic duty, but his subconscious and instinctive self shrinks from destruction. Any disability is in a way a godsend; the cheerfulness of the wounded when they have got 'a Blighty one' is notorious. The physician has to recognize this situation frankly, and to consider by what methods he can counteract any enervating influences, keep burning the flame of resolve, and maintain the morale of his patients. Morale is as important in the hospital as in the trenches; it should be the keynote of reconstruction as of destruction.

"The military situation, however, is not the whole story; as in civil life we cover up all the intimate causes of our nervous invalidism by the conventional explanation of overwork, so the stress and the strain of war are apt to be utilized as a blanket explanation of disorders of subtle origin. It furnishes the welcome impersonal formulation; but the soldier has as complex a personality as the civilian, and it is often in the complexities of personal conflicts and difficulties that the explanation of obscure symptoms must be found.



The home situation, the attitude to parents, sweetheart or wife, memories of the past, repressed desires and hates and jealousies—these are not irrelevant to the symptomatology of disorders of the heart; language bears witness to that with ‘heart burning,’ ‘heart sick,’ ‘his heart was in his mouth,’ ‘stabbed to the heart,’ ‘fear in his heart,’ etc.

“To analyze the contribution made to the symptomatology of heart disorders by such factors no doubt requires experience, but an open mind and a nice intuition will solve many individual problems with benefit to the patient.”

*(To be continued)*

## Current Literature

### II. SENSORI-MOTOR NEUROLOGY

#### 6. BRAIN.

**Wilson, S. A. K.** EPIDEMIC ENCEPHALITIS. [Lancet, July 6, 1918. Med. Rec.]

Wilson discusses the occurrence in England of a number of cases which might be classified as acute encephalitis or polioencephalitis but which do not conform to any rigid type. He points out that the subject is of particular importance at the present time in view of the public interest in food questions, since polioencephalitis is essentially the product of a toxic or toxi-infective agent. The author describes the cases under consideration as a nervous disease presenting features sufficiently indicative of encephalitis and characterized by pathological drowsiness amounting not infrequently to stupor. He remarks that this latter symptom has not hitherto been observed to anything like the same extent in poliomyelitis, endemic or epidemic, as it occurs in England. A number of cases are given in detail, and from a study of these Kinnier Wilson tentatively puts forward the following conclusions: Epidemic encephalitis is an acute nervous disease characterized by general and localized symptoms; it attacks both sexes, irrespective of age; its onset is acute and, occasionally, it is fulminant in type. The general symptoms are: apathy, lethargy, drowsiness, pathological sleepiness, stupor, absence of initiative. Restlessness and restless delirium with reduction of mental activity to the degree of automatism is common; catatonia or *flexibilitas cerea* is frequent; delusions and hallucinations may occur, also incontinence, headache, giddiness, and vomiting. Epileptiform changes do not occur. It is to be noted, however, that even at the height of the illness the patient's response to questions is in act and word surprisingly accurate and rational. Temperature is usually normal. In a certain percentage of cases meningeal symptoms are present, but as a rule these are not well marked. Localizing symptoms: the commonest grouping is of the polioencephalitis superior type, *i. e.*, a peri-aqueductal grouping. Paralysis to accommodation and corresponding indistinctness of vision or diplopia is a frequent early symptom, and the patient may even have the appearance, from mere drowsiness, of bilateral ptosis. Involvement of the lower cranial nerves is present to a variable extent and the predilection for motor as opposed to sensory cranial nerve nuclei points to a specificity of action of the postulated virus of the disease. The limbs are more rarely involved, and the author points out that where

this occurs the indications point to cortical, subcortical, mesencephalic, or pontine invasion of the corticospinal paths and not to cord invasion. Sensory symptoms are insignificant or absent and the diversity of localization precludes the likelihood of any constant or characteristic change in cutaneous or deep reflexes. No organism has been detected by any observer in the cerebrospinal fluid or in the tissues, with exception of a diplostreptococcus recovered by von Wiesner from the brain of a *Macacus rhesus* inoculated subdurally with an emulsion of the brain and cord from one of Economo's patients. It is significant, however, that a filtrate from the original brain cord of the same patient inoculated into a second monkey produced no symptoms. In cases where meningeal symptoms occur there may be definite pleocytosis. The duration of the disease is variable; it may end fatally in a few days or it may last for months. It is not certain whether there is a complete restitutio ad integrum in recovered cases. The pathological findings show meningeal congestion of cranial surface, and, microscopically, diffuse thickening of the leptomeninges, with scattered cellular exudates or with vascular congestion and perivascular cellular infiltrates, together with minor changes in the cerebral substance and cord. Similar epidemics have been reported by Economo in Vienna in the beginning of 1917, in Paris by Netter in the spring of this year, and in Queensland and New South Wales by Breinl. Economo coined the name *Encephalitis lethargica* and Netter adopted the term *Encephalite léthargique épidémique*, lethargy being in all cases a prominent feature of the clinical picture. Kinnier Wilson, however, prefers the term *Epidemic encephalitis* and concludes that what is new is the occurrence, in epidemic form, of cases of encephalitis not to all appearance due to the action of a known infective or toxi-infective agent, but presenting clinical symptoms any or all of which have been noted in various kinds of encephalitis with which the neurologist has long been conversant. He adds that unquestionably there is now afforded an excellent opportunity of solving the problem of the affection and thereby clearing up much that has been obscure in our knowledge of encephalitis in general.

**Hall, A. J.** EPIDEMIC ENCEPHALITIS. [B. M. J., Oct. 26, 1918.]

The points made by the author may be summed up as follows: Is this, or is it not, an epidemic of poliomyelitis? If it is not, then it may be either an entirely new disease, or one that until recent times has not been observed in epidemic form. The clinical resemblances, such as there are, between these cases and poliomyelitis were recognized from the first. In his paper he calls attention to the absence of cases of "localized limb paralysis commonly seen in acute poliomyelitis." The clinical differences, however, have been recently stated by Wilson [see preceding abstract]. Lethargy and asthenia, so severe and prolonged in most of the cases of encephalitis, are not recorded as occurring in

typical cases of poliomyelitis, either sporadic or epidemic. He cannot think that any one would consider the term "sleeping sickness" descriptive of poliomyelitis in general and yet it would not be an inappropriate name for this epidemic. In fact, if one takes away the palsies from these cases of encephalitis, little remains which is common to them and to poliomyelitis. Even the palsies present striking differences in the two diseases in their mode of onset, situation, and results. In poliomyelitis the onset tends to be rapid and maximal; the regions affected are usually those innervated from the spinal cord; the distribution often unilateral. They frequently leave permanent residual effects of greater or less extent in the area first attacked. In the recent epidemic, the paralysis are typically of gradual ingravescent onset; they almost always affect regions innervated by cranial nerves, and are often bilateral. So far as our evidence goes at present, they usually leave no permanent residual effects in the area first affected.

It is known that many nerve poisons, for example, diphtheria, *B. botulinus*, lead, alcohol, etc., show a peculiar predilection for certain particular parts of the nervous system. In these cases of epidemic encephalitis there seems to be such a definite selective action at work.

It has been said that the commonly held view of poliomyelitis as essentially a cord disease is based too much on sporadic cases, and that in its epidemic form it is characterized by the multiformity of sites affected. This line of argument rather accentuates the clinical difference between poliomyelitis and the cases in the recent epidemic. The latter were notable for the uniformity of the sites affected.

As regards the possibility of this being an old disease which has only recently been recorded in epidemic form he has no proofs to bring forward. It is known that a similar epidemic appeared about the same time of year in 1917, as recorded by Economo in Vienna, and that Netter has recorded similar cases in Paris. Possibly, in the course of time, records of sporadic cases of a similar type may be found stowed away in the pigeon-holes of other disease—poliomyelitis, influenza, etc.—where they have been regarded as abnormal or exceptional varieties. Such a line of inquiry seems worth consideration. Not until these alternatives have been set aside can we speak of it as a new disease; and, in any case, the final decision must rest with the pathologist.

**Morquio, L.** LETHARGIC ENCEPHALITIS. [Rev. Med. d. Uruguay, Aug., 1918.]

Three cases of lethargic encephalitis as described by Netter, and by Economo, two girls of 10 and 12, and a boy of 13, are the recorded cases. Headache, fever, convulsions and unconsciousness suddenly begin the disorder, the stupor persisting till death, the fifth and twenty-third days in the girls. The other patient recovered after a period of lethargy with slight meningism. Necropsy revealed a superficial and

diffuse congestive and inflammatory process in the brain, with apparently normal cerebrospinal fluid. There was no meningitis, no tumor. One patient slept constantly, had ptosis and diplopia, headache and general depression, no general disturbances and no rise in temperature. Actual coma, with death the twenty-third day. Tuberculous meningitis was excluded. Another child, with somnolency, revealed a tumor of the hypophysis.

**St.-Martin, De, Lhermitte.** PRIMARY POLIOMESOENCEPHALITIS WITH NARCOLEPSY. [Bull. d. l. Soc. de Med. Hop., May 17. J. A. M. A.]

De Saint-Martin and Lhermitte report two cases in which headache and invincible comolence for a few days were followed by diplopia and ptosis. The bilateral paralysis of the third pair was complete, involving not only the external ocular muscles but the musculature of the iris, with paralysis of accommodation and the light reflex, but no signs of involvement of other nerves or the cerebellum. They define the cases as primary superior polienccephalitis, and regard them as the same disease with Chauffard and others have been reporting and calling lethargic encephalitis. They think this name should be reserved for sleeping sickness. In the district in central France where they encountered the two cases reported, an epizootic is prevailing among poultry almost in epidemic form.

**Mackenzie, G. W.** TEMPOROSPHEOIDAL ABSCESS. [Jour. Pennsylvania State Med. Assn., Jan., 1917.]

Abscess of the brain including that of the temporosphenoidal lobe may be superficial, or deep in the brain substance with an intervening layer or relatively normal brain between the abscess and the skull fossa. Deep abscesses result generally either from the disintegration of a thrombus or a vein communicating between the middle ear and the brain substance by a process of so-called reflex or by the perivascular sheaths of the arteries.

Abscess of the brain may occur in an acute form running its course to a fatal determination within a few weeks, or when it becomes encapsulated, it may last for months and even years. As a rule, the older the abscess the thicker the capsule tends to be. The character of the infecting organism no doubt influences the course and determines in a measure the presence or absence of a capsule.

The symptoms found in abscess of the temporosphenoidal lobe may be divided into (1) those originating from the primary infection of the middle ear spaces; (2) cerebral pressure symptoms common to any intracranial affection capable of producing increased pressure; (3) focal or localizing symptoms due in some instances to a stimulating irritation from congestion, in other instances (somewhat late) to the suppression or loss of function from destruction; (4) distant symptoms usually pro-

duced by pressure (for instance the jamming of the medulla against the opposite rim of the foramen magnum or a nerve against its foramina; (5) associated complications including sinus thrombosis, suppuration of the labyrinth, circumscribed or diffuse meningitis, extradural abscess, etc.; (6) toxemia from absorption of the products of the abscess.

**Keen, W. W.** BRAIN TUMOR. [J. A. M. A., June 22, 1918.]

A case of brain tumor, operated on successfully by Keen, is reported by him, with its subsequent history after thirty years' survival, together with a necropsy report by Ellis. The patient was a man who had suffered a fall, at the age of three years, on to a brick pavement, causing a fracture of the left side of the skull, the inner table only being involved. Twenty-one years later epileptic attacks set in followed by intense pain in the head. The attacks took place once or twice a week. The patient was also partially deaf in the left ear, and the right ear had been discharging at intervals since he was five years old. There was paralysis on the right side which had lasted over two years, but had improved so that he could use his arm and leg. An intermittent loss of vision was also observed, and mentality was much impaired. The diagnosis was brain tumor, though it was thought best to try potassium iodid before operating. The operation was performed in December, 1887, with the aseptic provisions then in vogue. A one and one half button was removed from the skull, exposing the tumor, but the opening had to be still further enlarged till it measured 3 by  $2\frac{1}{2}$  inches. The tumor dipped behind the squamous portion of the temporal bone for one half inch, and the dura was adherent to the brain except at the margin of the large opening. The tumor, however, was successfully enucleated with free but not dangerous hemorrhage. While the hemorrhage was being controlled the large cavity left was half filled by brain tissue. The tumor was a fibroma, which gradually grown on the detached fragment of skull. It weighed 3 ounces and 49 grains, almost a quarter of a pound. "It displaced  $2\frac{1}{2}$  ounces of water. Its size was  $2\frac{7}{8}$  by  $2\frac{1}{2}$  by  $1\frac{3}{4}$  inches. Its circumference was  $7\frac{1}{4}$  by 6 inches. Its posterior border reached backward nearly to the rolandic fissure." Eight days after the operation the floor of the cavity which was also the roof of the ventricle evidently gave way, thus opening the ventricle, and therefore to the end of the fifth week there was free discharge of cerebrospinal fluid. The postoperative symptoms are described. Any muscular effort caused a bulging of the brain through the cavity which could not be closed. The later history is that of a stationary condition, and then of a slow deterioration. The epilepsy was markedly better, and the patient was still able to report to Dr. Keen up to within two or three years of his death, which occurred January 29, 1918, or thirty years and forty-five days after the operation. The necropsy report is by Dr. Ellis, and its pathologic interest is in the extensive exposure of



the interior of the left lateral ventricle for over thirty years. To avoid injury of the brain, Dr. Keen had a curved piece of tin fastened to the inside of a skull cap worn by the patient. The case is probably unique as regards the length of life after operation, and the wide open ventricle. It was Dr. Keen's first brain tumor operation, and one of the first on record. It interested Dr. Keen especially in the surgery of the lateral ventricle, and caused him to recommend, for suitable cases, the operation of tapping and draining the ventricles and to describe a technic which is now almost commonplace in its general use.

**Knapp, P.** TEMPORAL LOBES AND PSEUDO CEREBELLAR ATAXIA. [Deut. med. Woch., June 27, 1918.]

Knapp shows that lesions of the temporal lobes may cause an ataxic syndrome absolutely simulating cerebellar ataxia. This ataxia is an important symptom of lesions of the temporal lobe, after which should be mentioned sensorial aphasia (left temporal lobe), partial paralysis of the third pair and contralateral hemiparesis due to compression of the cerebral pedunculus. These four symptoms serve to differentiate pseudocerebellar temporal ataxia from true cerebellar ataxia, as there is nothing characteristic in the gait which would lead to a correct diagnosis. At autopsy, as Loewenstein has shown, there is no macroscopic nor microscopic lesion of the cerebellum. Pseudocerebellar ataxia from lesion of the temporal lobes is, consequently, not due to a distant action on or by extension to the cerebellum, corpora quadrigemina or the labyrinth, and should be considered as a focal phenomenon. It can only be explained by admitting that the temporal lobe contains a cortical mechanism for equilibrium.

**Strachauer, A. C.** BRAIN TUMOR. [J. A. M. A., Sept. 14, 1918.]

The author reports a case of brain tumor which he thinks illustrates a new principle to be followed in the surgical treatment of these growths. Craniotomy for brain tumor frequently fails to disclose the neoplasm. The evidence of increased pressure may be present, but inspection, palpation and exploration by incision or aspirating needle fail to reveal the cause. Definite localizing information, however, may develop after decompression, and the brain tumor may then be taken out by reoperating. The cases with focal symptoms before operation, and those without, which do not develop localizing data are considered hopeless and the patient dies. The necropsy shows the tumor. In the case he reports a deep-seated tumor had developed, and by the assistance of the cystic degeneration that occurred after the first operation, which may have been favorably influenced by the decompression, had to a degree come to the surface, revealing itself, and was removed by a second operation, the patient recovering his power to walk and the control of his sphincters. The causes of death in neurologic surgery are discussed and the advantages of decompression stated. Cessation of respiration is rather a

common occurrence and may be the cause of death. Another factor that is responsible for mortalities, and the most frequent one, is shock. Direct shock is subject to the laws of concentration, and dosage and rapid operation is equivalent to a concentrated dose of shock and is to be avoided. Indirect shock is synonymous with hemorrhage, which should be within the control of the operator. The special point of the paper is that operation for brain tumor failing to reveal the cause is not necessarily hopeless, and that deep, inaccessible tumors may develop in time and become accessible, and reoperation may turn defeat into victory.

**Jones, W. A.** CEREBRAL EDEMA FROM PRESSURE. [J. A. M. A., Oct. 19, 1918.]

Jones takes up the subject of localized cerebral edema from various causes, especially from pressure conditions, and also to call out similar cases, recorded or observed by members of the Section on Nervous and Mental Diseases. General cerebral edema is a frequent accompaniment of many of the bodily disorders commonly associated with stupor, convulsions, and fundal lesions. When these combinations of symptoms occur it is reasonably fair to assume that the mobility of the cerebro-spinal fluid has been altered, possibly due to circulatory disorders within the cranium. Jones reviews the theories of edema of the brain, quoting more specially from C. G. Mills and Preston and Rawling who have called attention to the possibility of localized cerebral edemas. Jones also reports two personal observations which bear on the subject. His conclusions are that there are undoubtedly many cases occurring of unsuspected, local or general cerebral edema. Patients with a history of localized injury, however remote, may have a localized cerebral edema from pressure or from simple concussion of the brain with or without infection. Occasionally focal symptoms may be wholly due to a localized edema and Jones thinks cases of epilepsy may justify exploration for such conditions. There are many cases of hard thick skull obstructing free circulation in the pia-arachnoid and in the cortical veins and lymph spaces which may be temporarily or permanently relieved by a decompression operation.

**Redlich, E.** WAR EPILEPSIES. [Wien. med. Woch., May 4, 11, 1918.]

E. Redlich studies the possible parts played in epilepsy by such factors as syphilis, intestinal worms, burying by bursting shell, etc. The writer has met with other cases in which the epilepsy became manifest during service at the front, although he was unable to fix upon any etiological factor. Many of such instances may be related, Redlich maintains, to disturbances of the vasomotors. In his second paper Redlich discusses the emotional factors more fully, stating among other things: These peculiar emotional reactions enter into the class of individual variation and is not of necessity in relation to an hereditary taint or evident antecedents. It is this "reactivity" that is to be invoked in order

to explain the frequency of epilepsies born from the influence of the moral or traumatic shock of war.

**Jelliffe, S. E.** *THE EPILEPTIC ATTACK IN DYNAMIC PATHOLOGY.* [New York Medical Journal, July 27, 1918.]

Jelliffe approaches the problem of epilepsy from a dynamic point of view, which would look upon many disease manifestations not as entities in themselves but as expressions of faulty energy discharge. The human machine, as a whole, is considered as a transformer of the energy acquired or captured from the universe in which he lives. The modes of transformation are metabolic, sensori-motor and psychic. Therefore many epileptic attacks, not all, may be looked upon as a faulty energy discharge of the entire human being rather than of an isolated organ or part of an organ. Explanation and therapeutic approach have been long unsuccessfully made upon the metabolic or physicochemical level or the sensorimotor in some partial manner of attack. A practical basis is now also being sought, the writer states, from the psychical side. This means more than a superficial psychological approach which merely observes and classifies results of certain potent factors. It must enter truly within the psychical life through the dynamic or energy concept. Consideration of the three different forms or levels of energy discharge of the human organism explains the variety of epileptic phenomena and the predominance sometimes of one set of phenomena sometimes of another. Interference with any one level alone may check or repress the explosive energy force only to cause disturbance in some other part of the organism. Even psychological description of inadequate reaction to difficulties becomes of value only as it enters the whole field of the patient's energy transformation and discharge. It is necessary to enter into the patient's extreme egocentricity and the limitation and hampering of his energy through this, which have always marked his reactions to the environment. This demands exhaustive analytic work but it enlists the coöperation of the patient and a reasonable and high demand upon the guiding and controlling of his emotions and instinctive life through his intelligence. It necessitates an alertness of attention upon the shiftings and interchangings of energy which exist in the patient. It means research in the unconscious life for infantile wish impulses and immature tendencies which seek to express themselves in a world of reality where they do not work. The epileptic is in this more extensively and exclusively egoistic than the ordinary neurotic and the profundity of unconscious return in the classical convulsion indicates the depth of the ego unconsciousness, which at such times completely controls, at all other times colors all his modes of action and thought. This extreme egocentricity is accompanied by a shallow readiness of approach which marks the external superficiality of affect. This makes it difficult to rouse the patient's interest in the treatment but signifies rather than denies the strong emotional content which is so deeply bound up in the ego to the exclusion of outside interests. This may be bound

with an external compulsive form of action, which also indicates this emotional separation of interests, with the intensity of the profoundly hidden ones. The love life shows the same superficial aspect on the one hand and absorption in the infantile on the other. This background is not a successful one for facing reality and so at times the struggle resolves itself through the convulsion into absolute control on the part of the unconscious of all levels of activity, psychic, sensorimotor and metabolic and this works in deterioration to such a permanent control. Various writers have recognized the emotional factor underlying the epileptic attack and have been inclined to separate off an emotional or hysterical epilepsy from a genuine epilepsy. This seems to the writer not well founded and also unnecessary in the light of the energy concept. Practically, the same approach through psychoanalysis must be made in order to understand the psychical side and therefore the complete working of the dynamic process in the production of any or all of these forms of attack. The convulsion sometimes represents a direct flight into sexuality, but sexuality of a distinctive infantile nature.

**Tomiselli, A.** PREGNANCY AND STATUS EPILEPTICUS. [Ann. d. Obstet. e Ginecol., Apr., 1917.]

The author's case observation is utilized to call attention to the need of differentiation of eclamptic from other types of attack during pregnancy.

**Bisgaard, Jarlon, Nørvig.** TREATMENT OF EPILEPSY. [Hosp. Tid., July 7, 1918. J. A. M. A.]

Bisgaard and his co-workers have been studying the chemical reactions of urine and blood in epileptics during and after seizures and in the intervals. The alveolar carbon dioxide tension and electrometric determination of the concentration of oxygen ions coincide in demonstrating as a seizure impends an increase in the blood and urine of substances giving an alkaline reaction. During the seizure and afterward there is a pronounced turn to an acid reaction. They interpret the acid reaction as an effort on the part of Nature to restore the normal balance between the alkaline and acid reactions. Certain data presented render this assumption plausible, and suggest that in treatment of epilepsy efforts should be made to combat the pathologic tendency to alkalinity. This might be realized by giving acids or other substances to increase the oxygen ion content of the blood, or accomplish the same by dietetic means or physiotherapy. They emphasize the close concordance between the chemical reactions in blood and urine as they veer from normal to alkaline while the seizure impends. Then both veer to acid during and after the seizure. The conflicting findings in the literature were due in large part to the unreliability of the older technics applied. All the testimony to date indicates that the composition of the urine undergoes certain abnormal changes, by which the degree of acidity is materially altered.

**Plantier, L.** SPASMOPHILIA AND INTOXICATION AND EPILEPSY. [Rev. d. Med., Sept., 1916.]

Spasmophilia is here thought of as an inherited taint whatever that may really mean. It may develop, he holds, from lead or alcohol poisoning, and coffee or tea may by immoderate use predispose. Spasmophilia may develop from relics of meningitis or encephalitis in early childhood.

**Retinger, J. M.** THE SEROLOGICAL LOCALIZATION OF ORGANIC BRAIN TUMORS. [Archives of Internal Medicine, August, 1918.]

The author records some results gained in localizing gross brain lesions by using a slightly modified form of the dialysis method of Abderhalden for testing the blood serum. Of the cases in which this method was used, 25 had been sufficiently studied clinically, or verified by operation or necropsy, to be considered. The clinical diagnosis or symptoms were not known to the writer, who performed the serological tests in most of the cases. On the basis of the findings in this limited series of cases, the serological diagnosis was supported in four instances by post-mortem results, in two by operation, and in 15 tests were found to be in complete agreement with definite clinical evidence. Two cases differed from the clinical diagnosis, but the latter had not been controlled by necropsy or operation, and in one case the necropsy proved the test to be erroneous. These results seem promising. The principles of this serological method of testing are familiar. It is found that pathological processes, or even physiological processes as in pregnancy, occurring in organs may release into the blood stream ferments found to possess a specific digestive faculty for such organs; this faculty can be tested by the power of such serum to digest "substrates" of the particular organ suspected, obtained and estimated under delicate laboratory conditions. In these tests the substrates used were obtained from human brains from necropsies of normal people. All the large vessels were removed, and in the cortex only the grey matter was used. The pieces were cut into small particles the size of a pea and thoroughly treated to remove all blood, fat, and lipoids. Each substrate was labelled according to the site from whence it was obtained. Against these various substrates the serum of the patient was tested, the presence of its digestive power, as determined by the ninhydrin color test upon any particular substrate, indicating the probable involvement of the same area in the patient as that from which such substrate was obtained. A brief résumé of the cases examined is given. Case 10 is an interesting instance. Thirty-four different substrates were used. The motor area in the cortex showed pronounced positive reactions. The pituitary also gave strong reactions. The lesion lies in the anterior lobe of the pituitary. Diagnosis: acromegaly with occasional epileptiform attacks. Case 18 is also instructive. Forty substrates used. Lesion not in cortex. Most pronounced reaction with the cerebellar grey matter, dentate nucleus, anterior pituitary, and corpus callosum. The final diagnosis

was a lesion of the cerebellum, confirmed on operation. Many of the other examples given are equally convincing, suggesting that, in some hands at any rate, the method may come to possess a more than academic value.

## 7. SYPHILIS OF THE NERVOUS SYSTEM.

**Cummer, C. L., and Dexter, Richard.** CEREBROSPINAL SYPHILIS. [J. A. M. A., Sept. 7, 1918.]

These authors give their opinions, based on five years' practical experience with the Swift-Ellis method of treating cerebrospinal syphilis and its Ogilvie modification, in reply to the criticisms of Dr. Bernard Sachs. They say it is distasteful to them to enter into a controversy, but they cannot let some of his assertions pass unchallenged. Sachs endorsed the statement of Halliburton that the use of salvarsan in locomotor ataxia and like affections via the cerebrospinal fluid has been abandoned, as it is fatal not only to the syphilitic organism but also to the patient. This is flatly contradicted by the personal experience of the authors. In five years they have administered more than 220 injections to thirty-four patients. Absolutely no ill effect has been noted. It should be understood that the authors' experience is limited to the use of auto-arsphenamized serum and to Ogilvie's modification. Another objection of Sachs' is that claims were made for the intraspinal method chiefly by men whose interest was centered on a change in the Wassermann reaction, in a reduction of the cell count of the cerebrospinal fluid and in a change in the globulin reaction rather than in the clinical condition of the patient. Cummer and Dexter reply to this that the clinical rather than the laboratory results were the single consideration as benefiting the patient. No one would ever attempt to interpret the significance of laboratory findings taken alone, but they are willing to say dogmatically that clinical improvement goes hand in hand with them, as a rule, though not absolutely invariably so, but to argue from rare exceptions as Sachs does is hardly logical. The next argument against intraspinal treatment offered is that it takes the experience of a trained neurologist and psychiatrist to estimate at their true value changes in the clinical symptoms, and they reply that any observer is capable of seeing the difference between the ataxic and nonataxic and between complete disability and power to earn a living. The assertion that there is nothing the intraspinal method achieves that cannot be accomplished by the intravenous method is answered by the fact that there are a definite number who would receive no aid from one or the other of these methods of treatment. The authors have been struck with the number of tabetics who are unable to endure mercury, and while they do not raise the question as to comparative value of the two methods here, they give a case report which illustrates this point and support it by further facts. They conclude, taking all facts into consideration, that, properly employed, the intraspinal method is not in any sense dangerous



and that excellent evidence of its value is offered by patients who repeatedly endure the painful reactions caused by intraspinal injection. Little or nothing can be expected from it in fully developed paresis, but it has many advantages in many cases of tabes and syphilitic meningitis in which other methods have failed. The results of laboratory examination of the blood, and especially of the spinal fluid, must be considered an integral part of the clinical picture, both in the diagnosis and in the treatment. The ground gained by patients under this method has been so permanent that it cannot be explained as merely a coincident remission in the progress of the disease. The authors conclude with a number of case reports illustrating their contentions.

**Wilson, S. A. K., and Gray, A. C. E.** ACUTE SYPHILITIC MENINGITIS. [British Med. Jour., Sept. 29, 1917.]

Acute syphilitic meningitis may be regarded as appearing under three phases or at three periods in the course of syphilis: (1) It may occur as an acute exacerbation in cases of congenital syphilis; (2) it may develop during the secondary period or very soon after the cutaneous exanthem or even at a pre-roseolar stage; (3) it may be an episode in the tertiary stage, arising in the course of a chronic gummatous syphilis, long after infection, and sometimes when the lesions in the nervous system have appeared to be latent or quiescent. In the first and third of these the meningeal syndrome occurs along with other symptoms or signs of syphilis, whereas in the second, the clinician may be faced with the picture of an acute meningitis and he must depend upon the history or the examination of the cerebrospinal fluid or on certain variations in the clinical symptom-complex, for a diagnosis.

**Paillard and Desmoulière.** ACUTE SYPHILITIC MENINGITIS WITH TURBID CEREBROSPINAL FLUID. [Presse médicale, Sept. 12, 1918.]

These observers report the case of a Chinese laborer who was brought to a hospital with a meningeal syndrome and subfebrile temperature of about 38° C. Lumbar puncture yielded a frankly turbid fluid, macroscopically similar to that of cerebrospinal meningitis. Immediate examination of the fluid showed very pronounced lymphocytosis and mononucleosis, without any bacterial organism. The Bordet-Wassermann proved to be strongly positive in the cerebrospinal fluid and blood, in spite of the absence of any syphilitic lesion of the skin or mucous membrane upon careful clinical examination. Intravenous injections of neosalvarsan, with mercurial treatment, rapidly overcame the morbid manifestations. This case is emphasized as showing that an acute syphilitic meningitis may appear at such an interval from the secondary stage as to be entirely unaccompanied by secondary disease phenomena; that the condition may be subfebrile—a condition existing six days in this instance; and that the cerebrospinal fluid in such a case may be macroscopically turbid and of the type of an aseptic puriform meningitis.



**Dujardin, B.** MENINGEAL REACTIONS IN SYPHILIS. [Arch. med. Belg., June, 1918.]

This author discusses the important problem how long after infection may meningeal signs appear in lumbar puncture. He says that after a period of two weeks changes may begin to show themselves. The spirochetes then enter the blood, the meninges react with slight lymphocytosis while the skin shows no sign. The septicema progresses, the spirochetes proliferate in the skin foci. Several weeks later they develop in the meninges.

**Thomas, B. A.** INTRASPINAL AUTO-AMINIZED SERUM TREATMENT OF CEREBROSPINAL SYPHILIS. [Medical Society Pennsylvania, Sept. 23. J. A. M. A., Nov. 30, 1918.]

Arsphenamin therapy, either intravenously or intraspinally, cannot restore degenerated spinal cords. Intraspinal treatment accelerates the restoration of the spinal fluid to normal, arrests the degenerative process and insures greater permanency of therapeutic results. Intraspinal treatment by auto-arsphenaminized or arsphenaminized auto-arsphenaminized serum injections should supplement intensive intravenous therapy when necessary. Cases of endarteritis with vascular or circulatory disturbances and those with exudative gummatous meningitis, also many cases of tabes dorsalis, respond satisfactorily to intravenous therapy alone. Cases with marked tract or cortical degeneration offer little, if any, hope of improvement. Treatment in qualified cases should be continued until the findings in the spinal fluid, as well as the blood, are rendered negative, except globulins, which may persist positive in many cases irrespective of the amount of treatment. Mercury and the iodids continue to be indispensable supplementary therapeutic aids in the treatment of cerebrospinal syphilis.

**Sicard and Roger.** SYPHILIS OF NERVOUS SYSTEM. [Presse Méd., Sept. 9, 1918.]

A negative Wassermann test of the cerebrospinal fluid excludes general paralysis according to these observers. Tabes however may be negative. The course of tabes may be favorably modified by intensive treatment. Lymphocytosis and albumin are less reliable than the serum tests as a basis for diagnosis. General paresis is a special form of meningocerebral syphilis, while tabes they term meningomedullary syphilis. The most radical treatments have been given paresis to no avail. Specific treatment to the limits has been given without modifying the disease.

**Schroeder, G. E., and Helweg, H.** SUBDURAL TREATMENT OF PARESIS. [Hospitalstid, July 17, 1918.]

Subdural injections of neo-arsphenaminized serum after trephining are here reported on. The authors tried it out on ten cases. The injec-

tions were given alternately by the vein and subdural, at intervals of two weeks to a month. They maintain if the spirochetes are found by trochar puncture in the brain substance this type of treatment is indicated. In most of the patients the disease was of too long standing for much hope of benefit. In three cases the disease seemed to have been arrested. In four the subdural injection was followed by weakness of the arm and leg. The authors suggest a closer correlation between cerebrospinal findings and the form of treatment adopted but advance nothing new.

**Higgins.** RELATION OF CONGENITAL SYPHILIS TO MENTAL DEFICIENCY. [J. A. M. A., July 26, 1918.]

The results of the serologic studies on fifty cases admitted to a psychologic clinic are recorded by Higgins. The material for this clinic is drawn largely from the retarded classes of the Richmond public schools, the juvenile court, and other agencies interested in the social welfare of the city. They were sent for the purpose of obtaining the estimate of their mental development as well as a clue to any factors influencing their mental and moral stamina. In this series 21, or 42 per cent., gave a positive Wassermann reaction. Their ages varied from 7 to 16 years. The series is composed largely of the middle and high-grade imbecile and only exceptionally with the low-grade idiot. Quite at variance with other reports is the striking relative absence of congenital syphilis or organic lesions of the nervous system. Approximately one half showed a general glandular enlargement. Defects of vision, tonsils, etc., were found no more frequently than in the nonsyphilitic series. The most interesting and suggestive physical aspect was the malformation and caries of the teeth. Temperamentally the series presented an interesting picture; fourteen of the twenty-one were either incorrigible, disobedient, or displayed fits of temper unlike those usually seen in the normal child. Higgins feels that the listless, low-grade idiot is so likely to be of syphilitic origin as the high strung, passionate child with wayward tendencies.

**Riggs, C. E.** NEUROSYPHILIS. [J. A. M. A., July 20, 1918.]

In his chairman's address before the Section on Nervous and Mental Diseases at the sixty-ninth annual session of the American Medical Association Riggs strongly endorses the intraspinal method of treatment of neurosyphilis. Under normal conditions, the choroid plexus is believed to be impermeable to the passage of all but a few drugs, but this is not universally true. Sachs' statement that intraspinal injections fail in serious forms of paresis and tabes is disproven by Riggs' experience and also by that of Amsden and Cotton. Intensive medication with draining of the spinal fluid to overcome the impermeability of the choroid plexus is a popular form of therapy apparently not specially favored by Riggs. Hammond and Cotton regard the intracranial method of medica-

tion as the most efficient procedure in paresis. Riggs emphasizes the mental symptoms of neurosyphilis in paresis and calls attention to the results of the different tests, which may be markedly different in different cases and at different times. They do not represent always the same pathologic condition. "The gold precipitating substance," says Weston, "is not the Wassermann producing substance," neither are the globulins and albumins believed to be the same. The colloidal gold test may become negative while all others remain positive and vice versa. The present attitude of those experienced in the treatment of nervous syphilis is best expressed, Riggs says, by Southard: "While it has always been conceded that the treatment would greatly help cases of diffuse and vascular neurosyphilis, the utmost pessimism has existed concerning the results to be obtained by treatment in cases of tabetic and parietic neurosyphilis, . . . and though it has been by no means settled in the minds of the various workers in this field as to what the ultimate results of such treatment will be, . . . still the majority of men who are treating these cases systematically feel very much encouraged."

### III. NEUROSES, PSYCHONEUROSES, PSYCHOSES

**Dubois.** SOMATOGENIC OR PSYCHOGENIC? [Schweiz. Arch. für Neurologie u. Psych., Vol. I, No. I, 1917.]

In opposing these two terms to one another Dubois claims that the psychiatrist need enter no metaphysical discussion of them but utilize an important therapeutic distinction. He amends a former statement of a principle of psychotherapy, "For a psychic ailment, psychic treatment," to read "For an ailment of psychical origin, that is to say psychogenic, psychic treatment." So for the choice of therapeutic means it is necessary to know whether a trouble is somatogenic or psychogenic. This does not mean a distinction between somatic and psychic. Some mental troubles are of somatic origin, in a certain measure, and therefore call for physical treatment though they are psychic in their symptoms. Daily, however, we observe somatic disorders which are amenable only to psychotherapy because of psychic origin. It is the primary cause and not the nature of the symptom which is therapeutically important.

Somatogenic and psychogenic causes may operate together both in the disorders which manifest themselves in the body and in the mind. It is necessary therefore, in order to distinguish etiologically, that every physician should be also a psychologist. No illness is without its mental states, ideas and emotions. In this psychic influence always present every feeling is an emotion and represents the psychological reaction and arouses the motor action. It is always the emotion, or as Epicurus himself put it, the desire, which initiates an action, and this is subject to a judgment of value based upon interest and advantage. The desire may be only instinctive or reflexive, not necessarily above the threshold of consciousness. Even the tic, which is often ignored, is an expression of intimate emotion. The facial expression is the delicate seismograph

of the psyche. The physiological reactions, resulting in pallor, blushing, tics, secretory processes, angiospasm, all have their teleological function in obtaining the object of desire or defending us against those things we fear. Pleasurable emotions produce useful reactions, emotions of displeasure are always destructive.<sup>1</sup> Exaggerated emotion tends to a psychoneurosis.

It is not sufficient nor in our present state of medical and hygienic knowledge is it hopeful, the author says, to lay too much emphasis upon somatic nervous hyperexcitability and the influence of physical factors, but rather to attribute the exaggerated emotivity to insufficiency of the judgment of value, a psychasthenic condition rather than a nervous one. The results of such a condition are not only functional suffering and disorders but also fatigue produced by the disordered functioning. This emotional fatigue then results in a further series of disturbances, which include painful sensations, incapacities, cephalgias, neuralgias, etc. Fear adds its effect to these already mentioned aggravating their influence by the anxiety which concerns itself with the diseased condition and its possible outcome. It reproduces and maintains purely mentally physiological conditions long since disappeared. All these things start not from the nerves or the central ganglionic centers. They have their origin instead in consciousness, that is in the sentient and thinking ego.

The author denies that physical causes can create a psychic state characterized by idea complexes and sentiments foreign to the original mentality of the subject. Cerebral trauma can suppress or interfere with mental function and accentuate a psychic state but cannot be the primary cause of any psychosis or of any psychoneurosis. It may influence the development of such a condition but the psychopathic condition has a deeper source in the original mentality of the individual, dependent upon heredity, education and the previous events of his life. This justifies the intervention of a rational psychotherapy in all the disorders. There is no physical malady where the psychical does not play its part and in analysis of symptoms it is always necessary to distinguish between the somatogenic and the psychogenic. Psychotherapy must therefore reform the defective judgments of value, and withdraw the patient from the fatal spiral of emotions into which he has become entangled.

Among these psychic states which constitute the psychoneuroses Dubois recognizes the neurasthenic states which show the symptoms of fatigue, functional weakness, physical, intellectual or moral, but though they may depend upon constitutional defect, or real fatigue from acute or chronic conditions in the environment, the emotional state plays the predominating rôle. There is the exaggerated emotivity and the insufficiency of judgment of value which makes this a psychasthenic rather

<sup>1</sup> It would be more accurate to say that pleasurable and displeasurable emotions result from useful and destructive actions respectively. The author probably means that the desire concerned carried constructively to its end produces pleasure, defeating its end, becoming destructive, produces displeasure.

than a true neurasthenic state. It is the psychic factor in any apparently purely material treatment which benefits these patients and they can be really restored to health only by a delicate, intensive, persevering psychic treatment. The term psychasthenic Dubois specially applies to those who add to the previous state obsessions, scruples, phobias, in which their insufficiency of judgment displays itself. He calls them, on account of these more striking manifestations, superior deviates. The hysterical state is marked by the importance which the subjects give to the physiological and psychological reactions due to their previous emotions. He believes that they can be easily roused from their dreams and are not to be taken too seriously. Hypochondriacs and melancholics easily reveal the psychogenesis of their disorders and must be reached by a patient psychotherapy which develops their moral personality. A new breeze, he believes, is blowing today through psychiatry, directing attention through hypnosis, suggestion, psychoanalysis and other forms of psychotherapy, to the psychological side of these ailments. This point of view also tends to more correct diagnosis in regard to dementia præcox and allied conditions. Many cases known as such respond to psychotherapy in a way that makes them seem to the author to be included in psychasthenia of a special type. He does not deny that in the actual psychoses psychotherapy can be used with success. In the delusion of persecution, for example, the fixation has developed upon a psychasthenia, a disposition to develop such ideas, and which in this preliminary stage may be corrected, or even in the later stage may be ameliorated by psychotherapy. Dubois repeats an ancient golden rule, The only way to cure those who have lost their reason is to teach them to reason.

L. BRINK.

**Holbrook, C. S.** PSYCHONEUROSES OF WAR. [New Orleans Medical and Surgical Journal, Oct., 1918.]

Holbrook says that at the beginning of the war the psychoneurotic cases were all sent from the trenches to the base hospitals, and then to England. Recently this plan has been much altered and these unfortunate men were treated comparatively close to the firing line. Special hospitals were organized in the zone of activity and psychiatric wards were added to the large general hospitals. The trend of treatment was to give intensified therapy near the front and to send to England only such patients as were not expected to recover in a few weeks or months. Psychoanalysis has a place in the treatment of shell shock cases, but, owing to the time required and the considerable experience required on the part of the physician, this method of treatment could be used in only a few cases. The results are excellent. Hypnotism had many advocates during the first years of the war and the results were good, but recently this practice has lost much of its popularity. There are three principles involved in nearly all methods: suggestion, reëducation, discipline. The aim of suggestion is to make the patient believe he will be cured, and to

lead him on from this to the belief that he is cured. Reëducation brings the desired function back to the normal by directing it until the bad habit is lost, and disciplinary treatment breaks down the unconscious resistance of the patient to the idea of recovery. The results of treatment have been quite variable. Percentages of cures have ranged from twenty-six to ninety-eight per cent. With appropriate treatment, given shortly after the neurosis develops, over ninety per cent. of these patients should recover, but should be discharged or assigned to home duty.

**Godfrey, C. G.** CASES OF STAMMERING FROM WAR SHOCK TREATED BY PSYCHOTHERAPY. [Medical Journal of Australia, Sep. 28, 1918.]

During the past two years a number of cases have been referred to Dr. Godfrey for treatment by hypnotic suggestion at No. 5 Australian Garrison Hospital, in which stammering or stuttering has developed, or has been revived, after years of disappearance, as the result of shell shock or of various war stresses. In the majority of these cases there had been in addition to the speech disorder, certain neurasthenic conditions, such as persistent muscular tremors, insomnia, functional paralysis, and so on, which had disappeared or diminished, but the stammer had remained as a severe and distressing defect.

It is pointed out that in all these cases the active cause is the psychic disturbance. Practically all the patients exhibit a temperament showing nervous excitability and many of them have a definite neurotic history.

Realizing the psychic origin Godfrey is treating these cases by applying, in the first place, psychotherapeutic methods, supplementing these, if necessary, with the recognized procedure of the expert who treats stammering and stuttering.

Each case of stammering, therefore, which has come under his care at the base hospital, he has hypnotized, and although he thinks it is premature to speak of results as cures, they have been at least gratifying. The method that he has invariably adopted, has been to induce a hypnotic sleep or lethargy, and to suggest to the patient that he is now perfectly at ease mentally, that he can now pronounce the stumbling words as easy as any other because his vocal mechanism is sound and intact, that where nervousness has interfered with his normal powers, the nervousness is no longer felt by him, that nothing prevents him from being able to speak clearly, and that he will be convinced of his ability to speak normally when he finds himself doing so on awakening. Godfrey then orders him to repeat after him simple words or sentences and leads up to difficult ones, and, in almost every instance these are spoken fluently and in a normal tone. Strongly expressed suggestions are given to the patient's capacity to speak equally well on waking. Sometimes a patient has been told to keep on repeating some well-known nursery rhyme and not to cease at the signal to awake, although, in the



middle of the rhyme, but to keep on talking. He will usually manifest his astonishment at finding himself talking without difficulty. Sometimes a patient will converse on waking without realizing that his stammer has disappeared, until his attention is drawn to it with amusing effect. In several cases, however, it is noticed that the stammer after disappearing entirely for some time, will return, but always in a less degree. In one case the patient spoke perfectly in sleep, at the first attempt to hypnotize him, although he had had a very bad stutter for eight months past, being almost inarticulate. He woke in a few minutes apparently cured, and has been free from stuttering ever since. It has been noticed that every case treated, even the worst, has been able to speak far better in the hypnotic state than out of it, all the interesting influences of emotionalism being then removed or diminished. This, in the opinion of Godfrey, surely establishes the condition as a psychosis rather than a neurosis. [Med. Rec.]

**Dupré and Logre.** WAR COMMOTION AND EMOTION. [Bulletin de l'Académie de médecine, July 30, 1918.]

These authors divide commotion or diffuse concussion of the neuraxis, due to nearby explosion of a shell or other forms of violent, vibratory impact, into three syndromes—the immediate commotional, the recent postcommotional, and the late postcommotional syndromes. The first of these consists of prompt and more or less protracted unconsciousness, a more or less profound state of coma, of the apoplectic type. The second syndrome follows the first, lasts a few weeks or months, and comprises subjective disturbances of a psychic order as well as objective disturbances of a neurologic order. The subjective manifestations consist of headache, dizziness, insomnia, asthenia, apathy, and a mental sensation of emptiness and nothingness, with amnesia. In more severe cases, occurring especially in those already predisposed, there may appear anxiety; maniacal, melancholic, or confusional agitation; hebephrenic or catatonic syndromes, hallucinations, motor automatism, etc. Hallucinations, however, are sufficiently uncommon to afford a sharp contrast between the post-traumatic and an infectious or toxic mental confusion. The neurologic symptoms constitute, in mild cases, a triad, viz., impaired vascular equilibrium, one side of the body often contrasting with the other; auricular disturbances, tinnitus, hyperesthesia, and often tympanic rupture and secondary otitis; cerebrospinal stigmata, viz., slight albuminosis, appearing in two or three days and disappearing after a few weeks, spinal hypertension, excess of glucose, etc. In grave traumatism, various signs of cerebral tissue injury may be superadded. The late postcommotional syndrome is characterized by slight asthenia or emotional instability, or, in the uncommon, more severe cases, by a permanent psychopathic state with neurasthenic symptoms and abnormal irritability, anxiety, pessimism, and an extreme morbid fear of the par-

ticular form of violence originally responsible, which renders the subject unfit for further service at the front. In the most severe cases, dementia may ultimately supervene. Emotion is often associated with commotion, but may occur separately. It is due, not to an external traumatic influence, but to a purely mental shock or series of intense affective impressions reacting upon the sympathetic and cerebrospinal systems. It results in an extreme degree of psychic and motor activity, associated with terror, flight—in brief, the defensive reactions of the instinct of selfpreservation. There follow signs of acute anxious emotionalism, restlessness, tremor, crying out, then quietude, with persisting irritability, fear, and a tendency to seek seclusion. Only in occasional cases are there added functional disturbances of abdominal organs, due to disordered innervation. Through a process of emotional anaphylaxis there may result continuous anxiety, incapacity for exertion, loss of weight, tachycardia, insomnia, and a grave general condition. Like commotion, emotion may ultimately cause chronic dementia.

**Briand and Philippe.** PAROXYSMAL STUTTERING. [*Progres Medical*, Aug. 4, 1917.]

Briand and Philippe comment on the remarkably small number of cases of stuttering brought on or aroused by the emotional stress of the war. In one case the soldier had stuttered from childhood. His speech had been natural until the age of 4 when, after a severe fright, he began to stutter and has had periods of stuttering since, alternating with periods of normal speech. The stuttering came on again in a severe form after shell shock, the features of the case analogous to those with rebellious deafmutism of emotional origin. The course of training which conquered the tendency to stuttering is described in detail. It commenced with breathing exercises, showing the patient the tracings and how he must learn to manage the diaphragm to bring the tracing to normal, training him in exerting the muscles necessary to regulate diaphragm functioning. This was accompanied by reading exercises in solitude, slowly reading the words in a low voice to himself, noting the letters that start the stuttering and meeting each one with a deeper, more prolonged respiration. The breathing exercises are done more readily while walking slowly than when seated or reclining. Any overexertion, exhaustion or strong emotion is liable to bring a setback. In the case described the stuttering was conquered in the course of three weeks.

## Book Reviews

**Ruhrah, John, and Mayer, Erwin A.** POLIOMYELITIS IN ALL OF ITS ASPECTS. Lea and Febiger, Philadelphia and New York.

The recent panepidemics of polioencephalomyelitis have stimulated an immense amount of medical activity which in its course has crystallized into numerous monographs, articles and text books the results of much of this inquiry. This is one of the most recent of these summaries of knowledge. It is entitled to considerable praise from the descriptive point of view. As a book it is well planned, well executed, convenient in size and presents fairly and in good perspective the main body of the facts collected.

Here and there the reviewer would differ from the authors. Thus when we are told that poliomyelitis is a comparatively recent disease we cannot agree. A minute's glance at the works of many medieval painters will show the characteristic deformities which are known to exist in no other disease than poliomyelitis. To quote one painter alone, Hieronymus Bosch in his "Cripples' Progress," painted 400 years ago, there are several of the characteristic poliomyelitis cripples. Thus the quadripedal locomotions in Bosch's pictures are to be interpreted quite similar to Fig. 43, p. 119, of this textbook taken from Gibney. The authors say certain deformities which have been found in sculpture might be due to other diseases of the nervous system, but they do not mention the diseases. The weight of evidence is on the poliomyelitis side thus far. Thus in the Naples museums there are unmistakable deformity statuettes which, as a neurologist, the reviewer sees only in the disease known as poliomyelitis and not as any other disease of the nervous system. This is a minor point, but as it relates to the larger biological concept of the evolution of immunity it is really something which should not pass unchallenged.

It is satisfying to note that the authors have advocated the principle of consciously guided action in the treatment of the paralyses. This might have been made more emphatic by pointing out that any exercise which did not have a definite wish component behind it is more or less useless. This should relegate the old time massage and electricity routine to its purely secondary position. This entire section on treatment is very satisfactory.

Taken as a whole this present volume is most praiseworthy.

JELLIFFE.

**Sidis, Boris.** *PHILISTINE AND GENIUS.* Boston: Richard G. Badger; Toronto: The Copp Clark Co., Ltd.

Sidis makes this small volume a rousing call to substitute reality, in whatever form it may appear, for the stultifying, too easily satisfying preconceptions with which the world occupies itself. These are the fashions in belief, in religion, in economic machinery, in sports, in education, with which we have long blinded ourselves. By holding to these, particularly in educational ideals we deny our children an opportunity for actual development, and that self knowledge and self control and ability to make use of one's powers which is the right of every child and which is his only road to real health. These false standards make pedants instead of teachers, tyrants instead of guides, shallow optimists who deny all evil that we may still revel in the form in which it appeals to our own particular self regard and self seeking. Under these standards our systems turn children into the same artificial automatons, making them philistines of outer polish and well formed habits, rather than the geniuses of genetic unfolding by which alone they can realize their lives. Also thus are sown within them the fears and anxieties which later make for nervous disturbances and mental breakdown. At the same time our blindness allows the waste and destruction and injustice and crime which go on in society. For this reason the author makes his stirring appeal for a different attitude and most of all for a reasonable cultivation of the child, allowing him to expand from within and prove his inherent right to be a genius. Precocity, he says, need not be feared and considered something pathological, but every child has the right to be aided in the evolutionary process by opportunity and guidance given to develop the higher interests instead of giving the early years over to those more primitive ones which progress should teach us to control.

The message is a true one in that it rouses to the facing of the real state of things underneath our false exaggeration of hollow ideals. Also because it lays such repeated emphasis upon the genetic approach as the only saving one in education. It may however be questioned whether the book has said all that is to be said of the existence of the more primitive impulses. After all, they, in their insistence, have been responsible for the building up of the false idealism as an unconscious defense against themselves and sufficient account must be taken of their right to existence while getting hold of these with the child and utilizing his education for their control. This both modifies and enriches the idea of the child as a genius and a precocious being by intrinsic right. Also it gives a fuller and more effective working basis for the psychotherapy which, the writer states, must meet the psychoneurotic results of the false standards. The book can, however, in its limited space, give only a suggestion of these things and in its vigor of appeal it leads to further constructive thought along these lines.

L. BRINK.

## Obituaries

### JAMES FREDERICK MUNSON

James Frederick Munson was born June 19, 1881, in Pontiac, Michigan, where his father, Dr. James D. Munson, was a member of the medical staff of the State Hospital for the Insane. Upon his father's appointment in 1885 as Superintendent of the Traverse City State Hospital the family removed to the latter community, where James Frederick Munson received his preliminary education under a private tutor and in the public schools of that city. He matriculated at the University of Michigan at Ann Arbor in 1898, receiving his A.B. degree in 1902 and M.D. in 1904. For two years subsequent to his graduation he worked as an assistant to Dr. Victor C. Vaughan in physiological chemistry. As a student Dr. Munson was quiet in manner and exact in his work.

In June, 1906, after a competitive examination, he was appointed as resident pathologist at the Craig Colony for Epileptics, Sonyea, N. Y. His inclinations were consistently progressive. In 1908 he spent six months in post-graduate study in European medical centers. In March, 1914, following a severe pneumonic infection, he was granted a year's leave of absence which was spent in Southern California.

Upon his country's entrance into war in 1917, Dr. Munson decided he was called to enter military service. He was duly commissioned Captain in the M. R. C., U. S. Army, entering active service in March, 1918.

After a few weeks' intensive neurological training in New York City and a brief period at Camp Lee, Petersburg, Va., he was assigned to Plattsburg Barracks, Plattsburg, N. Y., where in the prime of his life, while in his country's service, he succumbed to influenza on Friday, October 25, 1918. With military honors, his remains were interred October 28, 1918, in Oak Hill Cemetery, Pontiac, Michigan.

Dr. Munson was full of filial devotion, hesitating at no personal sacrifice that could add in the slightest to the pleasure of his parents. As a physician he was enthusiastic, painstaking in his efforts, conscientious even to a fault, and always displaying wonderful fidelity to his institutional duties, an indefatigable worker, being carried oftentimes by mental effort to the utmost limit of physical endurance, disregarding his own ease and well earned rest to be of service to others. His colleagues respected and esteemed him not only for his professional attainments and for his lucid and thorough reports, but for his modest and retiring disposition and his unobtrusive manner. He was an easy, fluent speaker,

his earnest manner, familiarity with his subject and well-modulated voice always carrying weight whether in private conversation or in the public meeting.



His thoughtfulness and consideration for the patients at the Colony were always so manifest that they were encouraged by the feeling that he had their best interests at heart. Employees had great respect for and unlimited confidence in him. While retiring in manner and sensitive he was never selfish, but always keenly alive to the feelings of others—never deliberately by word or act wounding anyone. His greatest pleasure seemed to be in promoting the happiness of others.

In his love of outdoor recreations he always remained youthful, his



great delight being in long country rambles and little exploring parties. His pleasant, kind and gentle personality will always remain in the memory of his friends and especially at Craig Colony, where he endeared himself to all, who mourn the loss of a sincere friend and a true gentleman.

Surviving him are his father and his wife, Helen Jane Wilkinson, to whom he was united in marriage in 1916.

He was a member of the Medical Society of the County of Livingston, of which he was President in 1914, a member of the American Medical Association and American Medico Psychological Association. For a number of years he took a very active interest in the National Association for the Study of Epilepsy, being secretary-treasurer and editor of its Transactions from 1908 to 1914, and vice-president at the time of his death. He published a number of articles on medical subjects, the majority pertaining to epilepsy.

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This was his last article.

W. T. SHANAHAN, Sonyca.

## LUDWIG EDINGER

Ludwig Edinger was a man of such forceful and constructive energy that his name and his memory cannot pass from the field of his activities. He was too closely associated with the progress of neurology and left his impress too definitely upon neurological knowledge and practice not to assure his continued influence. And yet his death, occurring in Frankfort-on-the-Main in January, 1918, was a most distinct loss to the medical world, in which he continued active in his researches up until the time of his death.

He was born in Worms, in 1855, where he also began his studies. Later he studied at Heidelberg and afterward in Waldeyer's laboratory at Strassburg. In 1877 he became assistant to Kussmaul, with whom he continued for two years, when he accepted the position of assistant to Riegel in pathological anatomy at Giessen. He had already shown his special interest in anatomy, his earliest researches being directed to the glands of the stomach. Now he turned his attention also to a study of metabolism and its disturbances, his researches embracing a variety of subjects such as asthma, hemoglobinuria, albuminuria and acetonuria. He was also interested in the study of the muscles in their relation to metabolism.

His first work in neurology was a description of the appearance of the motor and sensory areas of the brain and spinal cord in a case of congenital absence of a forearm. While at work in Giessen, where he also conducted a private practice, he realized the need for an extensive study upon the central nervous system and decided to devote himself to this field alone. For this reason he removed to Frankfort, where he continued the remainder of his life. Here he worked on brain anatomy and prepared his "Ten Lectures on the Structure of the Central Nervous Organs" which formed the beginning of one of the most important books on brain anatomy, a work which became very popular among neurologists. It passed through many editions and was translated into French, English—with an edition published in America—into Italian, Russian and Japanese. His manner of writing was clear, with an avoidance of unnecessary detail and directed to the purpose of bringing this still little understood territory closer to the practicing neurologist as well as to stimulate and guide to further research in it. Each succeeding edition has marked the progress which has been made, largely through his own researches in comparative anatomy in the study of brain anatomy and especially of the fiber tracts.

Comparative neurology particularly occupied his attention. By utilizing the staining process discovered by Weigert, with whom Edinger was associated, he studied the brain and nervous system of lower forms, following the crossed ascending connections of the sensory nuclei with the midbrain in the larval period in reptiles and in the human embryo.

He described also the secondary spinal cord fibers to the thalamus which accompany the anterolateral tract, which are now known as Edinger's fiber's, and worked upon the forebrain of fishes, amphibia and reptiles. His interest came to center chiefly upon the forebrain and the associative



fiber connections, the development of which he followed through other forms. He has given to neurology the recognition of the special divisions of the brain phylogenetically considered with their increasing complexity in development, which has led to the classification into paleoencephalon and neöencephalon. The primitive brain he regarded as an automation, its function being reflex and instinctive, while he saw the human cortex as the highest development of the gradual building up of the associative pathways and centers for higher psychic functions.

Edinger was associated with a wide circle of fellow workers, names familiar in various parts of the neurological world. He had realized the

need of a neurological department at Frankfort for the furtherance of the work of neurology, both for carrying on the work of research and as a center for meetings and discussions, and aided in the establishment of such a department in the University of Frankfort. He was a teacher who sought to stimulate in those with whom he worked an independent interest in the work. His own efforts grew out of a disinterested devotion to science and he watched with keen interest the successes of those he had started upon the pathway of research. His influence and his indefatigable industry in neurology served to make Frankfort a chief center of neurological authority. The Frankfort Neurological Society was organized under his leadership. He had also early interested himself in the work of those who had devised any mechanical appliances for use in research work and himself devoted attention to such construction. The high esteem of his many pupils and fellow workers returned to him at the anniversary of his sixtieth birthday, when a celebration was held in his honor.

In his later years he had turned his attention largely to the psychological side of neurology, to the relation between structure and function. He had also given special effort to the study of brain disturbances particularly as manifested in different forms of idiocy. He was always a practicing physician with a vital interest in the clinical and pathological side of the work. He gave also much attention to the occupation neuroses, tabes, general paresis, with special reference to the effect of luetic invasion of localities which were particularly exposed to hard toil.

His was a breadth of vision and an ability to grasp his subject in its complete relationship, which recognized the service of one science toward another in correcting and establishing data. He always welcomed coöperation and associated himself widely with other workers. His devoted pupil and fellow worker, Kappers, has said of him "He is a poet in science who sees the great goal to which all data lead." He himself wrote to Kappers shortly before his death, "My work keeps me up in these distressing times and I rejoice over the writings which show that intellectual workers at least still constitute a unity in the world."

SMITH ELY JELLIFFE.

# The Journal OF Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

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## Original Articles

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### THE RÔLE OF FOCAL INFECTIONS IN THE PSYCHOSES<sup>1</sup>

HENRY A. COTTON, M.D.,

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TRENTON, N. J.

Recent investigations in medicine have demonstrated the very important fact that the human organism must be regarded in its entirety, no matter what the symptoms of which the patient complains and for which the physician is consulted. Treatment based on the symptomatology alone in a given case may be successful in the simple maladies, but in the majority of cases the cause of these symptoms may be very remote from the region affected. The recognition of this principle that a pathological condition of one organ or region may affect some remote region has proved of value in determining the etiology of some of the most obscure disease processes and has revolutionized the therapy in such disease. By a peculiar perversity the seat or origin of the infection in the organ at fault may give rise to no symptoms, and its existence may be unknown to the patient and revealed to the physician only by a complete examination of every part of the body and the employment of laboratory methods to aid in its detection. Through the agency of the clinical pathology laboratory we have been able to reveal the presence of focal infections, and by eliminating them clear up these diseases with heretofore unknown etiology. The doctrine of focal infection has

<sup>1</sup> Read at the meeting of the New York Psychiatric Society, April 3, 1918.

met with considerable opposition in spite of the fact that a great deal of work has been done by various investigators. Probably this opposition is due to the fact that the earlier work left much to be desired, and unsuccessful use of the principle discouraged others from accepting it. Nevertheless, the pioneer work of T. W. Hastings deserves especial mention, and his insistence on the value of the complement fixation tests in determining the presence of the viridans group of the streptococcus is largely responsible for the investigations which have resulted in our conviction that focal infection had a very important rôle in the etiology of the psychoses. His paper (1) shows the difficulties of attempting to establish a new principle, and he is to be commended for his persistency in spite of many discouraging experiences. His subsequent work places these reactions on a firmer basis, although as far as we are aware (except for the test for the gonococcus) the fixation tests for the streptococcus have been used in very few laboratories. His work in demonstrating the relation of infected teeth to acute and chronic articular rheumatism deserves to be placed in the first rank in experimental medicine. Billings and others have substantiated his findings and the relation is generally accepted, although there are still some who doubt it. The only criticism of the work is that of all such pioneer work—the principle was not extended to take in other sources of infection, that is, tonsils, gastrointestinal tract and genitourinary tract. It is now recognized that while the original source of infection may be the infected teeth, these organisms may and do reach other organs, such as the stomach, intestinal tract, gallbladder, kidneys, etc., and if not eliminated from these secondary foci the removal of the infected teeth will be of no avail. This is especially true of the intestinal tract.

The recognition of the principle of masked infection has also been the means of demonstrating the close relation of the various specialties and their interdependence. Thus, the internist when consulted calls in the aid of other men in special lines, even though the patient does not complain of any special disorder associated with the symptoms for which the internist is consulted. Probably psychiatry has suffered from an arbitrary isolation in this respect, and we have been guilty of looking only at the mental disease as such and have not taken the broader view that some condition other than the mental picture might exist in our patients. But we have been ready to utilize methods in general medicine as soon as they were definitely established, as was the case in the use of the Wassermann reaction. In fact, Wassermann's coworker was Plaut from the psychiatric



clinic at Munich, although his name is never associated with the work except in the publication of the joint researches.

#### ORAL INFECTION

The necessity of coöperation between the various specialties could not be better illustrated than in dentistry and medicine. Not until recently has there been any coöperation between these branches, and even at present, in spite of the brilliant work of Hans Thoma, of the Harvard Dental School, and others of their own profession, many dentists refuse to admit any relation between dental infection and other diseases. They resent the physician interfering with their work, and in spite of the evidence to the contrary, they continue to put in the patient's mouth expensive bridge work and to cap teeth with gold crowns without making use of the simple expedient of radiographing the tooth to see if the root is infected. Thoma and others have emphasized the fact that no tooth should be crowned without first ascertaining what is at the apex of the root, and have called attention to the danger of this practice in laying the foundation for serious trouble later on. Another habit of the majority of dentists which should be soundly censured is that examining a patient's mouth and without a röntgenogram of the teeth tell the patient that the teeth are "all right." In my own experience this practice has often been the result of the patient's death later on.

It is a laudable ambition on the part of dentists to save teeth, but only when it has been demonstrated that the tooth is not already infected and liable to become much worse when capped and thereby furnish an ideal culture medium for the growth of bacteria. Hardly a patient of the better class is admitted to the hospital at Trenton who has not had expensive gold crown and bridge work, and our first act is to tear it all out, for by experience we know that it is infected. In a paper read before a joint meeting of the Mercer County Dental Society and the County Medical Society (2), I called attention to the danger of capping devitalized teeth and the value of the röntgen ray in determining apical abscesses, but my advice was not heeded. The amount of disease, suffering and even death which is caused yearly by failing to accept this simple principle is appalling, and it is time for the dentists to realize this fact.

Of course, we see patients who have neglected their teeth and have many decayed teeth and old roots. They have not consulted a dentist and we cannot blame the dentist for this state of affairs. But strange to say, decayed teeth do not seem to be so much to blame for diseased conditions as capped teeth. Perhaps it is be-

cause in decayed teeth there is an outlet for the bacteria and, aside from the danger of swallowing them, the bacteria are not so apt to cause trouble. When devitalized teeth are either capped, pivoted, crowned or filled, with a preëxisting infection at the apex of the root, the outlet is closed up and the bacteria continue to proliferate under the ideal conditions furnished by the dentist; they seek an outlet through the porous bone tissue and there gain access to the lymphatic system and migrate to other distant organs. The streptococcus types occasionally invade the blood stream.

The great stumbling block to the patient and the dentist, and to some extent the physician, is the fact that very extensive involvement of the roots of teeth can exist and be the cause of serious trouble without causing any pain to the patient. They argue that because they have no pain in the teeth or a tooth that that tooth cannot be diseased. Never was error more fatal, and in the cases where this fact is not recognized, the result may be fatal to the patient. The infection of these organisms is different from the acute infections so commonly seen. They are nonpus producing, cause no pain, swelling nor fever, and cause the patient no discomfort. Hence it is difficult to convince the patient that the tooth should be extracted. Treating such infections successfully can be done only by an expert dentist who realizes the dangers and controls his work with frequent röntgen ray examinations. Thoma contends that it is impossible to treat successfully these infections by any means, such as ionization or local application, and I am inclined to agree with him. If the patient's condition is serious, no time should be lost and the tooth should be extracted at once.

Great difficulty is found in a proper interpretation and reading of the röntgenogram. It will frequently give only the slightest evidence of the diseased condition and only when the bone is involved. The abscess is always much worse than it appears to be in the picture, and we extract when there is only slight evidence which could easily be overlooked. If the gums are not perfectly healthy looking, that is, pink and firm, but are purplish, swollen, with a red line adjacent to the tooth, or swollen so that they almost cover the crown of the tooth as in the molars, the teeth should be extracted. Often when the röntgen ray shows little if any disease at the root, there may be granulomata surrounding the tooth just below the gum or between the roots of molars, and this new tissue, which seems to be of a connective tissue type, when cultured is found to be filled with bacteria. So we have made it a practice, after many unpleasant experiences caused by being too conservative, to extract

every tooth that is at all doubtful. The error will always be on the side of conservatism, and we have never extracted teeth which we felt should have been left in the mouth, and after showing them to the patient they have readily agreed with us.

Another serious error of the majority of dentists is the opinion that vital teeth cannot become infected and therefore should not be extracted. Many cases which might have recovered are lost by adhering to this doctrine. A case which illustrates this point may be cited to advantage.

In the spring of 1917, a young boy, aged twenty, a patient of Dr. William A. Clark, was admitted to Mercer Hospital suffering with polyarthritis of a severe type and complicated with valvular heart lesion. He was anemic, emaciated and in an extreme nervous condition. An examination of the teeth by the röntgen ray showed several apical abscesses and these teeth were extracted. He did not improve and soon left the hospital and the treatment was considered by us a failure. Soon after leaving the hospital he sent for me and when I saw him I was convinced that something radical should be done if his life was to be saved. An examination of the molars showed a condition that I had not seen before. The teeth were milky white, but vital and had no fillings or evidence of decay. The gum was swollen and almost covered the crown of the molars. The patient remonstrated with me when I suggested that these teeth should be extracted, as the extraction of the other teeth had not benefited him. I could not tell him that extracting these eight molars would benefit him, but I told him that nothing else would save him. Finally his family prevailed on him to have them out. We extracted four at a time and the result was remarkable. He began to improve slowly and his pulse subsided from 120 to normal in a few days. His convalescence was rapid and in the summer he was accepted in the United States Navy as a physically fit individual.

#### RADICAL TREATMENT NECESSARY

If we wish to eradicate focal infections, we must bear in mind that only by persistence, often against the wishes of the patient and often against the advice of the dentist, can we expect our efforts to be successful. Failures in these cases at once cast discredit on the theory when the true explanation lies in the fact that we have not been radical enough. I have purposely gone into details regarding the elimination of oral infection, for I have learned by bitter experience that it is necessary for the physician to learn the facts and not be too dependent on the dentist for the treatment of these

conditions. I am indebted to my good friend, Dr. A. W. Currie, whose teaching in the early part of my work has meant a great deal to me. To Dr. F. S. Bird and Dr. F. W. Bird, of Trenton, I also am indebted for their coöperation and willingness to study these hard problems from a new point of view. We have worked out many of these problems together, learned by our mutual mistakes, until we think that few patients will escape with infected teeth if they will heed our advice.

We would emphasize the fact that most of the focal infections due to streptococcus have their origin in the teeth, and from this source, in the course of years, the organisms reach remote organs or other structures. Some of these infections are of long duration and may have existed in childhood. The progress is slow and insidious, and the dangerous feature is that the existence of the infection is unknown to the individual and was formerly not recognized by the physician. That the infection is transferable by direct contact cannot be doubted and parents may innocently infect their children. I have several cases which show the same infection in both.

One is constantly reminded of the prevalence of infected teeth, and bad teeth are seen on every side. A study of the parent's teeth may reveal some interesting facts and change our ideas of heredity, as has been the case in tuberculosis. I have seen very few cases in which I could positively eliminate the teeth as the original source of infection. The fact that a patient has lost all of the teeth is rather an argument for the infection having its seat originally in the teeth, which was of such a type that the teeth were eventually destroyed, and the infection lodged in some other section, usually the tonsils or intestinal tract. We must bear in mind that no matter where the infection is situated the absorption of the toxins continues, and can be eliminated only when the infection is found and eradicated.

Before giving the detail of our examinations as practised at present, it might be of interest to cite the history of one case which seemed to point to focal infection as a possible cause of the mental condition.

CASE A. A married woman, aged forty-five, was seen in consultation in March, 1913. She had had four children and the last child was born dead about four years before 1913. Since then she had had periodic attacks of rheumatism, asthma, and some obscure intestinal attacks called "chronic appendicitis." On March 1, 1913, she had an attack of acute articular rheumatism with fever and much pain. Under the use

of salicylates the attack subsided, and one week later the patient developed a severe type of delirium and was in this condition when I saw her. I must confess that it was the first case I had seen in which a psychosis followed rheumatism and I was somewhat puzzled, although since then several writers have described similar cases. The arthritis apparently disappeared when the psychosis developed. She became worse and two weeks later she was admitted to the State Hospital in a delirious condition. She talked irrelevantly, incoherently, and was extremely exhausted. A diagnosis of "toxic delirium" was made and rheumatism was put down as the cause. She improved somewhat mentally, but lost forty-one pounds in weight. The next year she improved under careful feeding and gained thirty-six pounds (120 pounds) and her delirium subsided. She never became normal, but was apathetic, unoccupied and indifferent to her surroundings. She never showed any spontaneity except when visited by her husband or family. At these times she was interested in the family and would talk about matters concerning them, but as soon as the family were gone she would relapse into the same apathetic and inert condition. She was not demented nor was she depressed, although at times she would cry without any apparent cause. She always recognized her family, but was disoriented as to time, place and persons mainly from lack of interest. She called the physician by the name of some relative and it was always the same name. When corrected she took it good naturedly and a few minutes later made the same mistake. She was a puzzle to every one and no one seemed able to classify her condition. When we determined to apply some of the newer laboratory methods, her case was the first one to be investigated. The fixation test for the *Streptococcus viridans* was positive and her teeth were investigated. All of her upper teeth were missing except two; and many of the teeth in the lower jaw were badly decayed, and when extracted abscesses were found on the roots and the *Streptococcus viridans* was found on culture. Her condition did not improve after extracting her teeth and we made the error of not investigating further for other sources of infection.

The subsequent history is of interest. She was given succinimid of mercury for a long period but without results. Her condition did not change until February 23, 1917, when she suddenly developed streptococcus meningitis and streptococcus bacteremia and died on February 24. The necropsy revealed a purulent meningitis with streptococcus in the exudate and in the blood.

Many explanations could be offered in this case, but it was evident that she continued to harbor *Streptococcus viridans*, and for some reason the infection became virulent, as is often the case with this organism. From the history it would appear that her mental condition was due to the toxic effects of the streptococcus, at least

that is the interpretation of the case from our standpoint. The case is interesting from the fact that it was the first case in which we could verify the action of the streptococcus both serologically and by postmortem examination. Had the fixation test proved negative when first taken, in all probability our researches would have ended there and this paper would never have been written.

#### METHODS OF EXAMINATION

The clinical laboratory methods used by us are those that are in use in most of the progressive general hospital laboratories. We have had a good bacteriologic department in our laboratory for the last ten years, and do all the typhoid fever and diphtheria work necessary, as well as make sanitary examinations of our food and water supply. This work is under the direction of a well trained bacteriologist, Mr. J. S. Williams, and from our experience with him for the last ten years I have no hesitancy in stating that his work can be depended on. We make routine examinations of the urine, blood, feces, and spinal fluid. Besides the usual examination of the urine, a culture is made from a sterile specimen if indicated. The feces examination consists of the usual chemical tests for the digestive functions and a bacteriologic examination for abnormal and pathologic bacteria. The difficulty of determining intestinal infection from an examination of the feces was apparent in our early cases, but in spite of this we were able to decide, through the help of Mr. Connellan, of the Higgins Laboratory, that certain of our cases undoubtedly had intestinal infection of a chronic type.

The examination of the blood is of the utmost importance. A numerical and differential count is made in every case admitted, and besides this the fixation tests are done. The Wassermann test of the blood is performed, and also the fixation tests for the bacteria responsible, for focal infections, such as *Streptococcus viridans*, and *Streptococcus hemolyticus*, *Bacillus tuberculosis*, and the Connellan-King gram negative diplococcus (designated in this paper as the Connellan-King *diplococcus*), and in some cases the gonococcus, although we have not been able to convict this organism of any part in the etiology of the psychoses. Cultures are made from the root cavities of extracted teeth, and, if indicated, from the tonsils and throat, also from cervical and vaginal discharges. The usual tests of the spinal fluid, cell count, globulin content, gold solution, and Wassermann reaction are made, besides the fixation tests of the spinal fluid for the other bacteria mentioned in the preceding. We



have also made cultures from spinal fluid, but with only partial results.

For two years, under the direction of Dr. Corson-White, we used the Abderhalden test for the disturbances of the glands of internal secretion. Our results have been published, and as we found that our results were uniform only in dementia præcox and epilepsy and negative in the other psychoses, we have discontinued its use as a routine examination. We were somewhat disappointed in the fact that the manic depressive group did not show positive findings with the Abderhalden test, as we expected that it would reveal some disorders of the ductless glands.

The patients are all examined mentally and physically in the usual way. Every patient is examined by the dentist as soon as possible. In fact, this has been our custom for the last three years. Every suspicious tooth is extracted and cultures are taken. When there is any doubt as to the extracting the teeth, the teeth are radiographed. But in the majority of cases the appearance of the teeth and gums, as described under oral infection, will determine whether or not the teeth should be extracted. Infected and enlarged tonsils are removed, the tissue studied bacteriologically, and later sections are made and studied. The temperature and pulse are especially noted, as often the presence of a rapid pulse with temperature less than 100 F. may indicate or at least suggest the presence of infection and toxemia.

#### TYPES OF INFECTION

The type of infection which has been designated "focal infection" differs essentially from the usual acute infections. The organisms concerned do not produce pus, consequently there is no pain, swelling or evidence of inflammation in the region affected, and no discomfort to the patient. This type of infection might be called chronic infection to distinguish it from the acute variety. The organisms causing this type of infection are nonpus producing, but very toxic, and resemble the Klebs-Loeffler bacillus in this particular, but are not so virulent. They are very slow growing in the tissue, and often take years to cause any serious trouble.

The principal organisms concerned in chronic infection belong to the short chain streptococcus group. Some of them are of the viridans type and others, which do not show the cultural growth of the viridans, at the same time have all the other characteristics. The gram negative diplococcus first described by King, J. J. (3) (4), and designated by him as the Connellan-King diplococcus, is

the organism found most frequently in our cases. The identity of this organism is still somewhat in doubt, but we are inclined to place it in the streptococcus group. Morphologically, it resembles the *Micrococcus catarrhalis*, as both are gram-negative diplococci, but the *catarrhalis* is a much larger organism. After repeated subcultures on agar, the C-K diplococcus shows a tendency to form short chains and to become gram-positive. Also the blood of patients with this infection will give a positive complement-fixation reaction to the nonhemolytic streptococcus antigen. Dr. J. F. Anderson, of the Squibbs Laboratory, has recently identified the Connellan-King diplococcus as a type of the nonhemolytic streptococcus. Cultures of the same organism examined by the State Board of Health Laboratory have proved to belong to the nonhemolytic streptococcus group. While this reaction is not constant it occurs quite often. Occasionally we find the *Staphylococcus aureus*, either alone or in combination with the Connellan-King diplococcus, concerned in these chronic infections. Case 3 was apparently a pure staphylococcus infection. The rôle of the colon bacillus in producing chronic intestinal infections has recently been emphasized by Reese Saterlee (5), who states that under certain conditions this organism may become pathologic, migrating to other organs, especially the duodenum, and cause serious trouble. We have frequently found the colon bacillus either alone or with the Connellan-King diplococcus in the stomach and duodenum, and in these cases the toxemia was of a very severe type, and the mental condition was of a severe type and of long duration. The pathogenicity of these organisms has been fairly definitely established, at least from a clinical standpoint, and I have personally had enough experience with the infectious and toxic characteristics of each, in patients other than those suffering from mental disorders, to be convinced that they play a very important rôle as causative factors in a number of systemic conditions.

The great difficulty in establishing the relation of these organisms to remote pathologic conditions is to be found in the fact that their presence is to a large extent masked, and their detection difficult by the ordinary methods of examination. If we regard the psychoses as purely psychogenic in nature and origin and do not consider the physical condition of the patient of any importance, these infections will be readily overlooked. The complement-fixation tests for the streptococcus group as established by Hastings has been the principal method, in fact, at first the only means we had of determining the presence of these organisms in the patients, and the

necessity for eliminating such infections. In our more obscure cases, which from the symptoms alone we were unable to classify, this reaction was the only clue to be found that threw any light on the nature of the process. Adopted as a routine examination, we soon found that many of our cases that could be definitely classified also gave a positive reaction to the fixation test, and led us to investigate further this phenomenon. It is true that these fixation tests are not so reliable as the Wassermann reaction, and we frequently get negative reactions when the organisms are present in the body. This has been explained by the fact of the existence of many strains of these organisms and the difficulty in obtaining antigen from enough strains to fix all the types met. Even without the fixation tests we can now determine the presence of these organisms by cultures from the tooth cavities and the tonsils and other sources.

The cases I wish to present for your consideration are eleven in number, and they represent three very distinct types of manic-depressive insanity. In the first group I have placed four cases of the severe manic type; all of the patients died in a comparatively short time after the onset of the mental symptoms. While this type is rare it is not unusual and we have had eleven cases come to necropsy in the last ten years. The second group comprises three cases of a rather mild hypomanic condition which recovered rapidly under treatment. The third group consists of three cases of profound depression, two of the patients have recovered and the third is improving. I have added another case of an earlier period in which no laboratory investigations were made, but which is nevertheless of interest because of the unusual features presented and because it tends to support our view of the infectious toxic origin of some of these types.

#### REPORT OF CASES

CASE I. *History*.—The patient was a single woman, aged thirty-six, with a rather unfavorable heredity. Her mother had an acute puerperal attack, depressive agitated in character, from which she recovered, but she also had minor attacks of depression. An older brother died at the age of forty-one in the State Hospital at Trenton ten days after his third admission in much the same condition as the patient. His first attack was at the age of twenty-four and was put down as "acute melancholia." Another brother died after a short illness of "blood poisoning." Patient was the youngest of seven children, healthy, industrious and for fifteen years worked in a watch factory. No constitutional traits were noted and as the case was examined by one who laid great em-

phasia on this feature we are safe in assuming that they were absent. She was taken ill ten days before admission to the State Hospital with a "grip cold" and had to stop work. Six days later she suddenly became manic, singing, laughing, and talking in an irrelevant manner. At this time she was seen in consultation. Specimens of blood and spinal fluid were taken, also cultures from the throat, which was much inflamed. Four days later she was committed to the State Hospital, April 5, 1916. She had no fever at first, but a very rapid pulse. Her blood was positive to the viridans fixation test and this organism was found in the throat culture.

*Examination.*—Physically she was well developed—height, five feet, two inches; weight, 155 pounds. She was very much excited, so that a thorough examination was impossible. This manic excitement became worse, she developed a temperature of 104 F. and some involvement of the lungs and died April 17, 1916, twelve days after admission and twenty-two days from the development of the cold. A necropsy was performed and nothing of interest noted with the exception of the lungs. There was no consolidation, the right lower lobe was brownish red in color with a large amount of fluid. A smear made at the time of necropsy showed a streptococcus, short chain type, and a culture gave pure *Streptococcus viridans*.

Aside from the interest in the mental picture we have here a striking example of the virulence of the viridans which caused the death of a perfectly healthy woman in twenty-two days, at the necropsy no other cause being found.

*CASE II. History.*—The patient, H. O., was a single woman, aged fifty-seven. No psychopathic heredity could be found and no previous illness or mental disorder. For the past year she had been in very poor physical condition and somewhat nervous. On February 3, 1916, she had an attack of "grip" and pleurisy from which she recovered in three weeks, and following this attack she developed religious ideas, became talkative, incoherent, and expansive. She wanted to be married and said she was the mother of Christ, etc.

*Course.*—She was admitted March 24, 1916, forty-one days after the attack of "grip," in a very excited state, showing much psychomotor restlessness, flight of ideas, distractibility, in short, a typical manic attack. Her physical condition suggested paresis, and that diagnosis was made at first and only changed after death as her excitement prevented a lumbar puncture. She had very bad teeth, and a week after admission she developed a severe infection of her right cheek which apparently originated from her teeth. She died April 3, two months after her attack of "grip." The *Streptococcus longus* was isolated from the infected cheek and the ulcerated stomatitis was also due to this organism. Moreover, the organism was also recovered from the blood stream. The

necropsy showed endocarditis and general septicemia. Her whole condition was apparently caused by a streptococcus infection probably originating in alveolar abscesses.

*CASE III. History.*—G. M. was a young Italian man, aged twenty-six. He had been in this country six years and after being drafted was serving at Camp Dix. One brother insane, one brother and six sisters healthy. During the six years which he had spent in this country he had been healthy, working on the railroad and making a good living. He never had any previous mental trouble, was not an excessive user of alcohol. In disposition he was jolly and lively and had many friends. He was sent to Camp Dix in September, 1917. After being in camp for one month he developed an ischiorectal abscess and was admitted to the field hospital October 16, 1917. About four days later he became very much excited and I was asked to see him. At that time he exhibited a typical manic reaction, sang, laughed, and was inclined to be violent.

*Course.*—I advised his transfer to the State Hospital and he was admitted October 25, 1917. He continued to be excited and violent and at times was delirious, but all through he showed a distinct manic reaction. He was five feet, eight inches in height and weighed about 180 pounds. He was very muscular and strong, so that it was very difficult to handle him. He refused food and died November 1, 1917.

*Necropsy Report.*—The necropsy showed pus in the muscles of the chest under the mammary glands on both sides and another collection of pus in the inguinal region. The pleura was of a deep red color, swollen and covered with a yellowish pus. The right lung showed a pneumonic condition involving the whole lung. The intestines showed a rather severe grade of catarrhal enteritis and they were bound with adhesions. No cultures were made, as the body was in a closed room for nineteen hours before necropsy, and the smears made did not show any tubercle bacilli, but in all the abscesses *Staphylococcus aureus* was found and the diagnosis of a tubercular lesion, is somewhat in doubt as the physical condition of the man was not that of a long tubercular infection, but corresponded to an acute virulent infection as is sometimes seen in staphylococcus cases.

The diagnosis of the first two cases, namely, manic phase of manic-depressive insanity, can hardly be questioned; but the third case, while presenting at first symptoms which were undoubtedly manic, soon changed to a manic delirium, and one would be justified in being puzzled by the clinical symptoms.

The following case is a recent one and is of such interest that we feel that we are justified in presenting it. Here the diagnosis is also in question. Whether we call it a delirious mania or manic delirium, either of which would place it in the manic-depressive group, the symptoms were distinctly manic at the onset, which was

very sudden and rapidly changed to those of a manic delirium with death in seven days from the onset of the acute symptoms, although she had been mentally unbalanced for some time before this. We were able to make a complete bacteriologic examination in this case and found the Connellan-King diplococcus in pure culture from the lungs, stomach, duodenum, kidneys, and liver, but cultures from the brain cortex, heart blood, gallbladder, and pancreas were sterile. The cause of death can hardly be questioned and the rapidity and virulence of the infection would convince the most skeptical that the Connellan-King diplococcus is a decided pathogenic organism and not the innocuous organism that some bacteriologists claim it to be.

CASE IV. *History*.—The patient, C. C., is a single woman, aged forty-three, and a trained nurse by occupation. There is nothing special in the family history. The patient was one of several children. Her early development was normal. Fourteen or fifteen years ago she and her sister left the mother after some disagreement and the mother knew nothing of them since that date. The mother states that the younger sister was dominated by the patient and that she might have married but the patient did not think any man was good enough for her sister. They were inclined to be seclusive, had very few friends, thought no one was good enough for them. They were supersensitive, took offense at slight things. The mother also states that the patient was self-willed, even as a child, and that she could not control her after the age of ten. Patient had been nursing in Trenton for some years, but was considered very peculiar by all who knew her. She and her sister, who was a teacher in the public schools, lived together in an apartment. On March 21, 1918, she sent the following letter to the writer:

"*Dear Sir:* I am an intimate friend of —, I knew her and her family since childhood. I am a trained nurse and would like to see you in your office. Kindly let me know when convenient to you.

Respectfully,

C. C."

A few days prior to this letter, the sister of the patient, a school teacher, had some altercation with the principal of the school, and following this she made charges against the principal, claiming she had been assaulted. Evidence, however, supported the principal, and there was considerable discussion of the matter in the papers. The patient visited the newspaper office and tried to have the matter hushed up. At that time it was noticed that she talked in a peculiar manner, and she was described as being intoxicated. On Sunday, March 31, the patient and her sister visited the brother of the principal of the school, with whom they had difficulty, and asked if the matter could be dropped. At that time it was noticed that they were both rather excited, especially the patient. They returned to their apartment and later in the day the sister



was found dead, with both wrists cut, and the patient was described as a raving maniac. She made many contrary statements, claiming she had killed her sister, but it was soon evident that she was insane and she was sent to the State Hospital on this date. In view of the letter which she had written ten days before, it would seem probable that she had some idea that she was not mentally right, and made an appointment for consultation. She did not come to see me, however.

*Condition on Entrance to Hospital.*—When admitted to the State Hospital, she was very violent, fought the policeman and all who tried to do anything for her. She was put in a hot pack and one fourth grain of morphin given. She slept some, but when awake was maniacal and abusive. The second day after admission her evening temperature suddenly went up to 107.2 F., pulse to 140. Her condition was extremely critical and she had frequent convulsions. Blood was taken for examination and lumbar puncture made. Urine was obtained by a catheter and a high saline enema of glycerin, epsom salts and soapsuds given. She continued in this state several hours and toward morning her temperature was 100. She was at times semistuporous and at one time in a maniacal delirium. She refused to take any nourishment. Temperature ranged from 102 to 103; the pulse was very rapid, from 130 to 140. She frequently stated she had killed her sister, but her statements were unreliable and no one will know the facts of the tragedy.

*Physical Examination.*—This showed a well nourished woman. Skin of good color. No evidence of enlarged glands. Pupils dilated, reaction somewhat sluggish. Patellar reflexes diminished. Abdominal reflexes absent. Very marked psychomotor activity. She slept but little, even with hypnotics. The thoracic organs showed nothing unusual. Lungs negative. Pulse varied from ninety to 150, depending very much on her temperature. Blood pressure: systolic, 140; diastolic, ninety. Examination of spinal fluid was negative; four cells per c.mm. Globulin negative. Wassermann negative in the blood and spinal fluid. Fixation test negative to tubercle bacillus; positive to streptococcus. Urine: specific gravity 1.025, acid reaction, large amount of albumin, indican present, large number of hyalin and granular casts, many leukocytes. Digestive organs: Patient refused to eat or swallow anything since admission, tongue dry, teeth covered with sordes. Throat inflamed. Teeth apparently good, but considerable bridge work and many teeth capped. The patient became more delirious and was tube fed for three days. She became somewhat jaundiced. Temperature reached 105. On April 8 she died at 8:15 a. m.

*Necropsy.*—This was performed at 10:30 a. m. On section of the body the panniculus was unusually thick and a deep lemon yellow color. Position of the abdominal organs not unusual. The pleura contained no fluid. Lungs normal except for a congested area on the lower lobe on both sides. Culture from this area gave pure culture of Connellan-King diplococcus. Pericardium not unusual. Heart small, tissue normally

firm. Heart was not removed as it was thought unnecessary to interfere with embalmer. Liver somewhat large, covered with many yellowish spots and on section showed some fatty degeneration. Cultures from liver showed pure culture of Connellan-King diplococcus. Gallbladder distended and containing a few gallstones. Pancreas was pathologic in appearance. On the surface pancreatic tissue had been supplanted by connective tissue in many places. It was somewhat shrunken. Cultures from the pancreas were negative. Stomach and intestines: Cultures were taken from the stomach and duodenum before they were opened, every precaution being taken to avoid contamination. These cultures gave pure culture of the same organism, Connellan-King diplococcus. The stomach was empty, walls were injected, rugæ were smoothed out. Adherent to the walls was much thick mucus. The duodenum was considerably injected, somewhat thickened and full of thick yellowish fluid. Cultures from the duodenum gave the same organism. The remainder of the intestinal tract was not unusual. Spleen was not unusual. Kidneys were enlarged, on section much bloody fluid exuded; they had the appearance of an acute hemorrhagic nephritis. Bladder somewhat distended, fluid, turbid urine. Ovaries were cystic, uterus not unusual. Brain: The brain was normal in appearance, no granulations in the fourth ventricle. No evidence of atrophy. Pia was clear, thin, and no evidence of meningitis. Cultures taken from pial fluid and cortex were negative. The cause of death put down was general infection by the gram-negative diplococcus, which we have identified as Connellan-King. It is interesting to know that the heart blood, pancreas, gallbladder, brain and spinal fluid gave sterile cultures, while the cultures from the stomach, duodenum, liver, kidneys and lungs were positive for this organism.

*Comment.*—With such a general infection as in this case it is evident that this did not develop from the blood stream, but through the lymphatics. The origin of the infection was undoubtedly in the teeth, with secondary infection of the other regions, which infection suddenly became virulent and caused the patient's death. Examinations of the tissues will be made. Had we made no bacteriologic examinations in this case, the cause of death could hardly be explained, although she had acute, hemorrhagic nephritis and fatty degeneration of the liver. The bacteriologic examination cleared up the cause of death and also gives further evidence of the pathogen'ity of the Connellan-King organism.

These four cases presented a typical manic reaction, but in the last two delirium soon followed, and the outcome was fatal because of the virulence of the infection. We might call them cases of toxic infectious psychosis, but that would only beg the question and leave us no nearer the solution of our difficulties. If no necropsy had been performed in these cases, they would have been put down as manic-depressive insanity and the cause of death, ex-

haustion. I have been guilty of such diagnoses and I think that many will answer to the same charge. But the necropsy here revealed an entirely unexpected complex and I think we are justified in our conclusions that the bacteriologic examination settled the cause of death, even if we have not established the fact that the mental picture was due to the infection. At any rate, the facts are as presented and caused us to pause and consider the importance of looking further in other cases without such fatal outcome. We will admit that these cases were atypical only in so far as the outcome was unusual. It is interesting that in seven cases of deaths in manic-depressive insanity, from 1908 to 1913, in which no bacteriological examinations were made, no adequate causes of death were found, even in the two in which necropsies were performed, whereas in four recent cases in which cultures were made the cause of death was evident.

## GROUP II

In the next series of cases we can show that the infection in each case was of a mild character and the mental symptoms were correspondingly mild and should be classified as hypomanic. They recovered rapidly when the source of the infection was removed.

CASE V.—*History*.—C. J., a married man, aged forty-three, did not have any evidence of nervous heredity, and was without constitutional peculiarities. He was well educated and for many years had been cashier of a large bank and a trusted and respected citizen. He did not drink and was considered a conservative business man, and there was no conjugal disharmony as far as could be learned. His first attack occurred in February, 1915, and lasted until September. He spent three weeks at one time and two weeks later in a private hospital, and was able to continue his work, although he was continually depressed and constantly complaining of his physical condition. He improved and was quite normal until his second attack in February, 1916. He was very nervous and irritable and went South for three weeks. He was much depressed, but gradually became better. About the middle of March, 1917, his wife noticed a recurrence of his nervousness and irritability. He began to speculate and became expansive in his conversation and very extravagant in his expenditures, in fact, exhibited all the clinical features of an early paretic. He soon lost his position, as the bank recognized that he was mentally abnormal. His habits changed and he did many things which from his training as a banker he had consistently condemned, such as giving checks when he had no deposit in the bank, and he did not realize the seriousness of his conduct. He was egotistical and domineering in his family relations and would

not listen to the counsel of his wife or his friends, of whom he had a large number. He had expansive ideas and talked of the big deals he was "about to pull off." Because his friends remonstrated with him he thought they were all against him and soon would not have anything to do with them. He was worse in the morning than at any other time, and spent a great deal of time away from his home and never gave any account of his trips. He would buy foolish and useless things, such as two major's uniforms, for which he had no possible use. He was very restless and constantly on the go. He would sleep but little and remained in his home but for a very short time. As soon as he came in and had his meals he was off again. He was able to control himself to some extent in the company of strangers, but was not tidy or particular about his personal appearance. He drank more than usual, but was never under the influence of alcohol. He was very profane and often obscene, which was contrary to his usual habit. He had a general feeling of well being and would not consult a physician as he felt perfectly well. I knew him personally for over a year and finally his wife induced him to take a trip to Camp Dix, ostensibly to see the camp, but in reality to have me look him over.

*Examination and Treatment.*—He talked as described and told how well he was, and it was with difficulty that I prevailed on him to submit to a blood examination and a lumbar puncture. His actions suggested paresis, but the physical examination revealed no signs of it. I argued with him in vain to come to Mercer Hospital and have his teeth radiographed, as I found that he had many capped teeth and considerable bridge work. He was pleasant to me, but angry with his wife for her conspiracy in getting him to me, and for a month he would not hear of me. I saw him later in his home city and had to go to many places as he avoided me and would not keep an appointment made with his family physician. We finally found him and I induced him to go to a physician to have his teeth radiographed, and, when the pictures were found to show apical abscesses, he came to Mercer Hospital and had a dentist extract several teeth. He was still very restless and would remain in the hospital only long enough for the dental work and then left to attend to his "big deals." He came back later, a few days after the infected teeth were extracted, and was much quieter and more reasonable. Cultures from the alveolar abscesses gave pure Connellan-King, and this organism was found in the urine. There was also a mild nephritis which cleared up after giving the vaccine. He soon lost his restlessness, was perfectly willing to submit to treatment and spent two months in the hospital without complaint, which was quite a contrast to his attitude a short time before. We isolated the Connellan-King diplococcus from his tooth cavities and also found the same organism in his urine. He was given an autogenous vaccine of Connellan-King, and in this case I am of the opinion that the vaccine had some value in clearing up the

acute nephritis of a mild type. The cultures from the stool were negative.

*Results.*—The rapid disappearance of the manic symptoms, after the extraction of the teeth, is noteworthy, as he was becoming worse and more difficult to manage, and his commitment to an insane hospital was seriously considered. He developed good insight into his conduct and willingly took advice as to his future movements and showed considerable remorse for his previous conduct. He became a little depressed later and a letter from his wife a few days ago stated that he was now about normal and anxious to get to work and support his family. The relation of the focal infection to the psychosis in this case cannot be questioned, as the immediate effect of eliminating the source of infection was a rapid clearing up of his manic symptoms, followed by a mild depressive reaction which is now disappearing. He is solicitous for his wife and has lost all his former irritability and perverse conduct.

*CASE VI.—History.*—The patient, V. C. L., was a married man, aged forty-nine, with two children. There is nothing of interest in his family history. He was a successful business man and no constitutional peculiarities were present in his case except a rather jovial disposition and an optimistic temperament, which was in no wise abnormal. He was the manager of a large business and his position was one of considerable responsibility. He had many friends and was ready to help any one that needed help. He was known personally to me for some years and I did not observe any marked peculiarities. He was a model husband and fond of his family. No conjugal disharmony is known of. His first attack occurred four years ago and was characterized by a mild exhilaration. He went to a private sanitarium and in a few weeks returned to his work. His wife states that since then he has been rather variable in his moods. In the summer he was inclined to be exhilarated, and in the winter months he was more or less depressed, but never to the extent that his efficiency was impaired. The present attack began in the summer of 1917. He became exhilarated, overbearing and extremely talkative, mainly along expansive lines. He was unable to attend to his business and was given a vacation for several months. He went to a private sanitarium, and from his extremely expansive ideas and the fact that his blood was positive to the Wassermann reaction a diagnosis of paresis was made and the family advised that he would never be well, but they were also advised to consult me for specific treatment. He resembled the case just cited and clinically had many features of paresis but no physical signs of that disease. The examination of the spinal fluid definitely ruled out paresis, much to the relief of the family. We also found a positive Wassermann reaction in the blood, but there was no history of syphilis and no evidence whatever of that disease. The positive Wassermann test can be explained only by the fact that in certain infectious conditions the Wassermann reaction is occasionally positive and may be misleading. I have seen this phenomenon in sev-

eral cases and have treated such cases with intravenous injections of arsphenamin (salvarsan), but without results. Of course, the teeth were radiographed and we were somewhat disappointed when no abscesses were discovered, but we will see later that we depended too much on the röntgen rays in this case. The feces were examined by Mr. Connellan and revealed evidences of a chronic infection. The following is a copy of his report:

*Laboratory Report.*—Feces examination: Color, dark brown. Odor, offensive. Appearance, mushy mass. Reaction, acid. Concretions, negative. Bile pigment, negative. Tests for hydrobilirubin, positive. Amylopsin, present. Trypsin, present. Indol, plus XXXX. Skatol, plus XXX. Food residue: Fibers, many large meat fibers showing no digestion. Starch, negative. Fats, negative. Other forms, small amount of vegetable residue. Blood: No red blood cells. Blood coloring matter, positive (plus XXXX). Pus, negative. Epithelium, occasional large flat. Crystals, negative. Mucus, few unstained masses. Ova, negative. Parasites, negative. Bacteria, almost totally grampositive. A pathological, unusual, coccus was found.

*Remarks.*—The findings show a toxic stool with many large meat fibers, showing no proteid digestion, heavy blood coloring reactions and the bacteria almost totally grampositive. We found the Connellan-King diplococcus in the stool and urine, and at first we were inclined to pay very little attention to this, but from later experiences, we now believe that such findings are of some importance. When cultures are made from the stool and urine these organisms frequently occur.

*Treatment.*—Because of the highly acid stool the patient was given alkaline rectal injections and placed on an alkaline diet. He was also made to take a modified rest treatment somewhat against his will, and steadily improved. His intestinal infection cleared up rapidly, under daily irrigations of anhydrous sodium carbonate. His hypomanic symptoms disappeared, and he soon developed insight and worried about money, whereas formerly he gave no thought to these matters, but spent it extravagantly. He entered Mercer Hospital in November, 1917, and remained there three months, at first under protest, but after three weeks he was quiet and coöperated with the treatment. After leaving the hospital he spent several weeks in the country with his wife and was apparently in a normal mental condition. He soon resumed work and for some months appeared normal, but gradually became a little depressed. This was not so marked as in previous attacks, and he was perfectly able to attend to business. He did not care to go out evenings, but preferred to remain at home. He was reëxamined several months later and a rather pronounced infection of the duodenum with the *Bacillus coli* was found, although the stomach was normal and free from infection. There was no evidence of any other infection.

*Comment.*—It is stated in the foregoing that the roentgenograms did not reveal any apical abscesses, but from our experience with other cases



of this type we were convinced that the intestinal infection present in this case had its origin in the teeth, although the roentgenograms were not positive. About three months after the patient left the hospital, and had been entirely normal mentally, we examined his teeth, and from the condition of the mucous membranes of his mouth and gums we decided that several molars should be extracted. When extracted these teeth were found to have eroded roots with large granulomas around the roots just below the crown, the cultures were positive for the Connellan-King diplococcus. He had recovered from his mental attack without the removal of the infection, but the probabilities are that had the infection remained it would only be a matter of time when he would have had a recurrence.

These two cases are so similar that one would expect a similar infection, which was the case, only in one the intestinal infection was worse than in the other. They were both treated in the general hospital without a nurse and very much against their wills, but the physical features of their disease were emphasized and not the mental features. And further, in both cases the condition was becoming progressively worse, so that confinement in an institution was considered as the next step. They reacted to treatment designed to remove the source of infection. The facts are here given and cannot be entirely disregarded even if our interpretation is not accepted.

CASE VII.—*History*.—The third case of this group is that of an Irish woman, single, of previous good mental health, and nothing extraordinary is found in her family history. She was the youngest of seven children and the other members of the family are normal and earning a good livelihood, but not of a very intellectual type. In the winter of 1916 the patient had an attack of pneumonia and was taken to St. Francis Hospital, where she made a good recovery. About a week after this attack of pneumonia and while convalescing, she suddenly developed a typical manic attack. She was in bed, with a nurse in attendance, and became exhilarated, laughing, talkative, with typical flight of ideas, rhyming and distractibility. There was marked psychomotor restlessness, but she would remain in bed when told to by the nurse. She talked continuously and her productions could not be interrupted. She refused to answer questions, but often showed that she heard them and gave willfully misleading answers in a playful manner. She would not recognize the physician, but made rhymes with his name. At no time was she delirious, but gave evidence that she was well oriented for place and persons, if not for time. The neurological examination was negative, and the blood and spinal fluid were normal. Lumbar puncture was made several times, as it was recognized that the case was a toxic one due to

the toxemia of the pneumococcus. We adopted this method, as in children we had seen after pneumonia several cases of toxemia resembling meningitis clear up rapidly after such puncture. The case was extremely grave and for a time it looked as if she would have to be sent to the State Hospital, but in about two weeks she cleared up. Her manic symptoms were much more profound than in the other two cases in this group, as there was present more psychomotor restlessness, continual productiveness with irrelevancy and distractibility. We are not prepared to say that the lumbar punctures were the cause of her rapid recovery, as we know that the toxemia of pneumonia is rather transitory and disappears soon after the pneumococcus ceases to be effective. She recovered fully and since that time, over two years ago, she has been steadily employed.

These cases are of a mild type, but the manic symptoms were unmistakable and they promptly recovered when treated as toxic conditions. They may be called our pioneer cases and certainly pointed the way for our future consideration of this group as well as the more depressed types. Another case may be mentioned briefly as it added further evidence of the infectious nature of this group.

The case was one of a young woman with an acute manic condition following childbirth. She had definite symptoms of infection, rather high temperature, etc. A member of our staff, Dr. James P. Sands, on his own initiative, gave her several doses of anti-streptococcic serum and she promptly recovered and left the hospital in a short time.

### GROUP III

In this group we have taken, as examples, types with a more profound psychosis of longer duration and much more resistant to treatment. The usual type is one of depression and we all know these types are apt to run a much longer course than the manic type, and tend to become chronic, especially in the later years of life.

CASE VIII.—*History*.—O. W., a single girl, aged twenty-five, had good mental endowment, although the family history is bad from one point of view. Her father committed suicide ten years before, although he was considered normal and a successful business man. Her mother was somewhat oversolicitous about the girl, her only child. She had been sheltered and treated as a child even at this late date, but apparently she did not resent this when normal. Her early life was uneventful. She was an exceptional student, learned easily and was much interested in her studies. She graduated from the normal school and in 1913 traveled abroad, spending the greater part of her time in Germany,

and learned German with the intention of teaching this language when she returned to America. Her mother accompanied her abroad. She was not a robust girl and was inclined to be anemic, and as her mother had had tuberculosis she necessarily was anxious in regard to her daughter. In the fall of 1915 she accepted a position in a school in the northern part of the State to teach German, and was very much elated and proud of the fact that she was about to realize her ambition. During the summer she had not been so well as usual and the doctor told her she had malaria, but it was a questionable diagnosis, as she had no chills, but some fever and malaise. She started to teach in October and did very well for a time, but she was kept very busy with her work and spent considerable time preparing the lessons after school hours and at night. She had a heavy cold or "grippe," and her temperature was never normal in the evening. At first she did well, but soon her mother noticed that she seemed to be under constant nervous tension. She found that she could not concentrate her mind on her work and that the discipline was getting beyond her. She had to give up her work and two weeks later came to Trenton. She talked continually of her work and at first had mild self-accusatory ideas which became much more prominent later on. She realized that she was not right, claimed that she had lost her memory and all that she had learned. She had a very poor appetite and lost ten pounds in a very short time. She was extremely nervous and had frequent vomiting spells and other gastrointestinal symptoms. She had expressed ideas of suicide, but her mother had not taken them seriously. She was much depressed and thought that she was no more good in the world and for this reason she wanted to do away with herself and relieve her mother of the burden of caring for her. She was staying at a house in Trenton near the railroad, and her physician, Dr. William A. Clark, had made an appointment for a consultation with the writer for 10 o'clock. At 8 o'clock she slipped from the house, ran to the bridge, threw herself over and fell about twenty feet, landing on the track, and sustained serious bruises, but no injury. She was immediately taken to Mercer Hospital and I saw her a few hours later. She was very much confused and agitated. She had very pronounced ideas of self-accusation and negation. She thought she was no more good, had lost her training, and was only a burden. She recovered from the effects of her fall, but her mental condition grew steadily worse and she had to be constantly watched to prevent her from committing suicide.

*Examination.*—Nothing was found in the physical examination except an extremely rapid pulse and a slight rise of temperature in the afternoon. She was much under weight and presented the appearance of a seriously sick person. She was admitted to the Mercer Hospital November 10, 1915, and remained there until April, 1916. Her blood was negative to the fixation tests, and the Abderhalden reaction was positive for the thymus gland. Treatment was instituted along the lines recommended by Doctor Ludlum, who saw her in consultation. She was

given five grains of pituitary extract daily and daily readings of the blood pressure were made. She did not respond to this treatment and after a thorough trial it was discontinued. From the marked tachycardia and the slight rise of temperature I came to the conclusion that her condition could be better explained on the basis of an infectious process, although this was the first case in which I had come to any such conclusion. She was growing worse instead of better, and it looked like a possible chronic type. She had persistent nihilistic ideas and a feeling that she would never be any good and wanted to die, and only by the closest watching was she prevented from carrying out her suicidal desires.

*Treatment and Results.*—We began to give her colonic irrigations daily and cultures of the bulgarian bacillus, as an examination of the feces showed evidence of intestinal intoxication and a streptococcus was isolated that belonged to the viridans group and was present in much larger amounts than normal. She was given an injection of anti-streptococcus serum and had a severe reaction, developing a rash that looked like the rash in serum disease, so it was not continued. After this eliminative treatment was given for some time she seemed to improve gradually and was able to leave the hospital in April, 1916, five months after admission. She went south the following winter and since a short time after leaving the hospital she had been entirely normal, and is living with her mother in perfect harmony and has had no return of her psychoses.

*Comment.*—I realize that this case may be criticized as not conforming to the rules that would definitely place it in the infectious group, and that the patient might have recovered, as so many do, without any treatment directed to the infection and its elimination. We realize that our methods at the time were very crude and inconclusive, and it was extremely difficult to establish the fact of the infection. Happily, we now are able to demonstrate the infection much more satisfactorily. Her teeth were not examined very carefully, and as caps existed we made the error of not having them radiographed.

*CASE IX.—History.*—J. H. was a married man of sixty years; he had no children. He was always healthy until six years ago. At that time he became depressed and agitated. He was sleepless and complained of a peculiar sensation in his head as if there were some extreme tension, and when these feelings came over him he would become very much agitated and restless, walking up and down the room. He was unable to concentrate on his work or attend to his business. He had some eye trouble diagnosed as glaucoma, and his condition became worse when he had these attacks. He spent some time in private sanatoriums and became worse instead of better. He was seen in the fall of 1916. At that time he was in a serious condition and had been unable to attend to his work for some months.

*Examination.*—A complete examination was made and from the

laboratory examination it was found that he had a positive fixation test for the viridans in both the blood and spinal fluid. Röntgenographs of the teeth showed many apical abscesses and considerable pyorrhea. He objected to having his teeth extracted at first, as he could see no relation between his infected teeth and his mental condition. He finally consented and cultures made were found to be viridans. He had chronic constipation and we found the viridans in his stool. He did not improve at once and was somewhat annoyed that he had allowed his teeth to be extracted.

*Treatment and Results.*—A vaccine from the viridans was given him and he was very slow in responding. He soon began to sleep better and did not wake up at three and four o'clock and pace the floor as he had been doing. During the summer he was very little better and went to the seashore. He had some serious business troubles and these worried him considerably. The following fall he came out of his depression and rapidly improved. He lost the worried, careworn expression which had been habitual with him. He was very active, took renewed interest in his business and told everyone how much he had improved. He is now attending to his business daily and is apparently normal.

*Comment.*—This case can be considered one in which the psychosis was directly connected with the infection of his teeth, which infection, as is usual in such cases, was of many years' duration and finally the toxemia invaded the nervous system, and to those familiar with the actions of toxins it does not stretch the imagination to assume that the psychosis was the result of the toxemia. There were no obvious psychogenic factors, no conjugal disharmony, and nothing in his constitution which would account for his psychosis.

*CASE X.—History.*—A. A. was a single woman, aged fifty-six at the time of her admission to the State Hospital in May, 1911; she had a negative family history and uneventful personal history, except an attack of scarlet fever with good recovery at the age of eight. She attended school when she was from six to nineteen years old, graduated second in her class and was considered a good student. Menstruation established at fourteen, and whether connected with this or her father's death, she had violent headaches which lasted two or three months, and also had headaches when at a private school. She worked at sewing for awhile and, after graduating, she taught school for three years. At the end of this period she broke off a friendship with a man in whom she was interested. This sudden change in attitude was a peculiarity of the patient's in her relation with other men. Soon after this her first attack developed. It was preceded by headaches and some stomach trouble. It was apparently an attack of hypomania and lasted from October, 1896, to January, 1897. She resumed teaching, and in 1900 she entered a training school for nurses, graduating in 1903. The following year she was operated on for appendicitis.

Her second attack occurred in August, 1904, and she had her recur-

rent headaches and was not well. The only psychogenic factor given as the probable cause was that her supplies in the hospital were cut down and she was very much annoyed. She was confused and depressed, and the psychosis lasted one month, after which time she returned to nursing and was successful until the third attack in August, 1908, at which time she had some difficulty with another nurse on a case, and following a near drowning accident she developed severe headaches and gastrointestinal disturbances, which were more severe during this attack and persisted throughout. She had marked physical disturbances during this attack and was in a mixed manic-depressive state. She recovered, and in December, 1908, she resumed nursing. The probable etiologic factor given was that the patient claimed that the family of the patient whom she was nursing had accused her of making love to him, but here again the profound physical condition is in evidence. The fourth attack occurred in November, 1909, after a good summer, but in the fall she was very irritable and faultfinding. Again there were headaches and stomach disturbances, and she would improve, but only for a short time. She was manic at first, but soon became depressed and stuporous and did not resume her work until October, 1910. On November 7 she again became tired, restless, and soon stuporous, and in this condition was sent to Bloomingdale. A very exhaustive study was made of her case and the history obtained from there is one of the best I have ever read. The personal traits do not show any abnormalities except frequent headaches, sometimes with exciting causes, and at other times not. She remained at Bloomingdale from November 15, 1910, until May 9, 1911, and during that time showed varied symptoms—stupor, manic excitement, and depression—and the diagnosis was "Allied to Manic-depressive Insanity." She had rather long periods of delirium and made frequent attempts at suicide.

*Examination.*—She was admitted to the New Jersey State Hospital at Trenton, May 9, 1911. At the time of her admission it was extremely difficult to make an examination, because she would answer only a few of the questions asked and usually in a low, sad tone, and in a careless and indifferent manner. Spontaneous speech was limited to a few disconnected sentences. She had a sad, dreamy expression, but appeared to observe what went on about her. She would not eat and had to be spoon-fed. Stream of thought could not be obtained. She was depressed, retarded and at times agitated and apprehensive. Disoriented as to time and place, but oriented for persons. Her attention was difficult to obtain. Memory for the immediate past was not good and retention was defective, as she remembered only the physician's name and nothing else that was told her. She read well, but without grasp.

*Course.*—Her condition changed but little in the next five years. She continued to have vomiting spells and severe headaches, at irregular intervals, and it was noted that she was suicidal. She spent most of the time sitting on the ward with her head bowed, hands folded, ab-



solutely unoccupied. She was habitually constipated and had to have an enema every few days. For months she would lie in bed flat on her back, indifferent to her surroundings. She had to be fed by spoon, as she refused food for most of this period. Occasionally she would utter impulsively a few expressions of profanity and, at times, would attack her nurses when they attended her. Her condition varied and, at times, she would eat spontaneously, but she seemed to be in the apathetic and impulsive condition so frequently seen in the terminal stages of dementia præcox, and no one had any idea that she would ever recover.

*Treatment.*—In June, 1916, the resident dentist, in going over all the ward cases, examined her teeth. At first she was so resistive that nothing could be done with her. Later she allowed him to examine her teeth and extract an upper molar, which presented a bad abscess. From that time her improvement was remarkable and steady. She dates the beginning of her recovery at this time, and on October 21, 1916, five years and five months after admission, she was discharged as recovered and has remained normal since that time.

*Subsequent History.*—She was visited by the fieldworker in April, 1918, at her home and was very cordial in her manner and very willing to talk over her case. She stated that she has no memory for her stay at this hospital, and no idea of the flight of time. She recalled one incident about a year and a half before she left the hospital, when she heard a nurse say that she, the patient, was forty years old. She resented this and said she was only thirty-six (her age on admission). The next thing she remembered was in June, 1916, and this was after she had had the tooth extracted. She was out walking and picked up a paper with "lunatic asylum" on it and asked the nurse where she was and if she was in such an institution, and was told that this was an insane hospital. From that period she recalls that she became interested in things and was especially interested in the flight of time and could not understand that so many years had passed of which she knew nothing. She has remained normal and has taken an interest in her friends, works at the Red Cross, visits, and her aunt states that, aside from a tendency to be sensitive, she sees nothing wrong with her. She has had several severe mental shocks. A first cousin, of whom she was very fond, died; but she showed a normal reaction to this death. Later a second cousin committed suicide, and last July her brother was called out in the militia, and a few weeks later his first child was born. Through all these times she has exhibited a normal reaction in spite of the severe mental shock these events have been to her. It has not been necessary for her to work and, in view of the fact of her sickness, her aunt has watched her and kept her from overdoing. She had very severe headaches after leaving the hospital every month after her periods, and stomach upsets as well; but these have become less severe. She attributes her mental breakdown to overwork and her physical condition and does not believe that there was any other cause.

*Comment.*—This case is cited for several reasons. The recurring headaches and gastrointestinal upsets are present previous to or during each attack, and in my opinion are of as much importance as the other factors given as the cause. The reason for her recovery is also of interest. She had no mental treatment; in fact, her environment was the worst possible for any good psychic effect; but in spite of this fact she did recover after her teeth were cleaned up and an infected molar removed. Are we to consider any mental readjustments as possible under the circumstances; or would it be entirely without the realms of possibility to consider that she had some serious intestinal infection coming from an alveolar abscess or other infection, to which she finally established an immunity after the source of the infection was removed, and the toxic effects were gradually lost? The theory that her psychosis was toxic in origin is certainly substantiated in the history and the rapid recovery after seven years. The diagnosis is not clear, for although there were periodic attacks which resembled manic-depressive attacks, the last psychosis, by reason of the nature of the psychosis and its chronicity, certainly could be classified in the deterioration group. But the diagnosis is not the essential factor in this case, as we observe many cases of a similar character, that is, with early periodic attacks but with a tendency toward chronicity. This phenomenon is also observed in many of the chronic infections, such as arthritis, infectious heart lesions, etc., in which after repeated attacks, usually becoming more severe, the patient finally succumbs.

#### THE ETIOLOGICAL FACTORS IN THE PSYCHOSES

From a study of the cases reported here, which are only several among many similar types observed in the last three years, we are convinced that chronic or focal infections, with the resulting toxemia, play a very important rôle in the etiology of the psychoses. These particular cases are reported because they were our earlier cases and are of historical interest in the development of our work. Even with the crude methods used at first and the incomplete examination, especially the bacteriologic work, certain factors stand out prominently and the results of a proper recognition of these factors has thrown some light on treatment as well as on the cause of death in some of the more obscure psychoses.

While we emphasize the importance of the infectious nature of these psychoses we do not exclude other factors, especially the psychogenic factors, in producing psychoses. But we are of the opinion that the latter factors have been given an undue prominence, to the extent that the physical symptoms of most of the mental diseases have been sadly neglected. We are convinced that heredity and endowment are of the utmost importance as a determining

factor in the etiology, when they exist. But in many of our cases these factors do not exist, and therefore they must be eliminated in a certain number of cases. Hence we are inclined to place heredity and constitution in a minor rôle, as determining the individual's reaction to certain toxins, but not determining the psychoses without these extrinsic factors. Meyer (6) has expressed the idea in which I fully concur in this manner. "The study of the constitutional make-up turns very largely on the question of the extent to which various features are determined by heredity and growth and immutable, or determined by heredity and growth and modifiable, and what inside and outside factors can be expected to have a functional and ultimately a structural effect."

By accepting this view of the problem we can harmonize the various factors that at present seem so antagonistic to many. We find no difficulty in giving psychogenic factors their proper etiologic rôle when they exist. However, we do not believe that they are essential for the production of the psychosis in all cases. When they exist in the same individual with the infectious conditions the psychogenic factors have a very profound effect. We can best understand the mechanism by which the psychosis is brought forth when we consider both of these factors playing an important rôle. We have been inclined to consider that such mental factors as grief, worry, fright, conjugal disharmony, friction, overwork, and mental strain, materially affect the whole physical being of the individual. Loss of appetite, disturbances of digestion, loss of sleep due to continued worry materially lower the vitality, cause loss of weight, and change the various internal secretions and also lower the immunity of the individual. It is not unreasonable to suppose that under these circumstances any latent infection, of the type we are considering, would soon become more active and finally virulent. We see so many evidences of these factors that we are inclined to think that this view of the mechanism of the various etiological factors is the correct one.

The various mental factors we have mentioned are as potent in other conditions as they are in the psychoses, for example, in tuberculosis. Therefore those treating tuberculous patients insist on a quiet routine, free from all disturbing mental factors, if arrest of the disease process is to be successful. That infection is present in many psychoses cannot be denied, and any one who makes a special effort will be rewarded. Just how prevalent these infections are will be discussed in another paper, but we believe that they are far more prevalent than one would expect.

## CONCLUSIONS

We could present many more cases that would substantiate our contention in regard to the importance of focal infection, but these examples will have to suffice for the present. From a study of these cases we are justified in concluding as follows:

1. That chronic, masked, or focal infections play a very important rôle in the etiology of the psychoses.
2. That the origin of most chronic streptococcus infections is in blind alveolar, or apical abscesses.
3. That the organisms concerned in this infection, spread from the teeth to other regions, notably the tonsils, stomach, duodenum and lower intestinal tract, and that these infections may therefore persist after the teeth have been extracted.
4. That the organisms concerned in focal infection in our cases belong to the slow growing, non-pus-producing type, which are, however, extremely toxic.
5. That the short chain or nonhemolytic streptococcus group (the Connellan-King diplococcus), the *Staphylococcus aureus*, and virulent colon bacillus are the bacteria that are most common in this type of infection.
6. That infected teeth are due to a large extent to (a) faulty dental work, such as gold crowns, caps and pivot teeth; (b) habitual neglect of the teeth, and (c) infection by contact with parents, family, and friends, by kissing, use of common articles and eating utensils.
7. That a thorough search for chronic infections by all the means at our disposal is imperative, and the removal of such infections will clear up certain mental conditions when other means have failed.
8. That prophylaxis in mental diseases should include the education of physicians and the public in regard to the danger and menace to both physical and mental health, of infected teeth and the difficulty in locating such teeth without a complete x-ray examination by a man competent to interpret the radiograms when they are taken.
9. That dentists should be brought to realize the damage they are doing daily by faulty dental work.
10. That many psychoses could be prevented and chronic psychoses cured if the principles discussed in this paper were followed.
11. That bacteriologic examinations should be an essential part of the work in every hospital for the insane.

In concluding, I wish to express my thanks to those who by their

timely assistance have made this work possible. The greater part of the work has fallen on the laboratory assistants who have been especially diligent in the task. I am especially indebted to my assistant, Dr. W. W. Stevenson, who, as clinical pathologist, has had charge of collecting specimens from the patients and correlating the laboratory and clinical work. To the members of the staff, I am indebted for valuable assistance in many ways, particularly in relieving me from the many details of hospital management, and thus allowing me to devote time to this study; to Dr. T. W. Hastings for his continued advice and assistance. To Drs. J. W. Draper, G. Reese Satterlee, J. J. King, F. S., and F. W. Bird, I wish to express my thanks for many courtesies and valuable help. I am indebted to Dr. E. P. Corson-White for her help two years ago, who at my suggestion inaugurated the use of the newer laboratory methods in our hospital, and to Dr. Adolf Meyer for his valuable help, friendly criticism, and encouragement in bringing this work to a successful conclusion.

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## THE SEX EXPRESSION OF MEN LIVING ON A LOWERED NUTRITIONAL LEVEL\*

BY W. R. MILES, PH.D.

Most of the recommendations urged for the saving of food in this country relate to the elimination of waste and to the use of substitutes. A group of workers at the Nutrition Laboratory believed that verified facts concerning prolonged restriction in the quantity of the diet might be of fundamental import in case of a real food crisis. Research was begun on this problem in September, 1917.<sup>1</sup> Two squads each composed of 12 young men selected from a large group of volunteers from the student body of the International Y. M. C. A. College in Springfield served as subjects. Squad A after preliminary measurements under normal dietetic conditions began, October 4, 1917, a regime of restricted diet with an energy content of approximately two thirds to one half of their supposed caloric requirement. When the body weight had decreased on the average twelve per cent., the food was increased that there should be no further loss. On the average, 1,950 net calories were required to maintain the weight at this lowered level. With the exception of two vacation periods and a few uncontrolled meals on certain Sundays the reduced ration was continued until February 3, 1918, a period of four months.

Squad B served as control. Prior to dietetic restriction, the basal metabolism measured at the Nutrition Laboratory inside the large respiration chamber at night was the same with both squads indicating that groups of twelve men were sufficiently large for comparison. From January 8 to 28, 1918, i. e., during a period of twenty days, the men of Squad B were on a ration of 1,375 net calories.

Throughout the investigation the men continued their regular collegiate work both scholastic and athletic. Many of the observations were made in a laboratory arranged specifically for this pur-

\* From the Nutrition Laboratory of the Carnegie Institution of Washington, Boston, Mass.

<sup>1</sup> Benedict, Miles, Roth and Smith, Human Vitality and Efficiency under Prolonged Restricted Diet, Carnegie Institution of Washington, Pub. No. 280, 1918 (in press); Benedict, Miles, Roth and Smith, The Effects of a Prolonged Reduced Diet on Twenty-five College Men, Proc. Nat. Acad. Sci., 1918, Vol. 4, p. 149.



pose at the college dormitory in Springfield. Alternately on Saturdays, each squad came to the Nutrition Laboratory in Boston. There was a full evening program of psychological and other measurements and the gaseous metabolism of the entire squad was measured during the night as they slept in the large respiration chamber. Other psychological measurements were made the next morning before the men returned.

The observation made in Springfield and Boston covered a wide range:—body weight, basal metabolism, total nitrogen in food, feces, and urine during the entire four months, pulse and respiration rate, total ventilation of the lungs, alveolar carbon dioxide, blood counts, blood pressure, rectal and skin temperatures, strength tests, energy requirement for walking a definite distance at a definite speed, and extensive psycho-physiological and clinical examinations. It is not our purpose to give here the results for these many data. Certain of them, however, may be summarized as follows:

1. When living at the reduced weight level, the basal metabolism was about 18 per cent. lower per kilogram of body weight than prior to reduction.
2. The systolic and diastolic blood pressures were lowered to about 90 and 65 mm., respectively.
3. The pulse rate showed a marked drop. For example, in Squad A five of the subjects showed many pulse rates 35 beats or below and one man gave 7 counts at 29 beats per min.
4. Body temperature, measured rectally, was normal, but the men complained of feeling the cold and wore more clothing.
5. Neuro-muscular coördination<sup>s</sup> presented some decrement, not enough, however, to interfere seriously with the duties of everyday life.
6. There was no falling off in the quality or amount of the scholastic work.
7. Strength tests indicated some decrease, but the normal amount of common physical activity appears to have been maintained.
8. The men were not apparently lacking in vitality nor were they inefficient. When engaged in vigorous athletics with their fellows a stranger could not have picked them out.

In connection with the psychological measurements the men from time to time gave brief accounts of their subjective impressions of the experiment. One man volunteered the statement that the reduced diet had in his case eradicated all sex desires. He was quite positive in this statement and it therefore seemed necessary to collect evidence from the other subjects in order either to prove or

disprove the generalization of this assertion. Accordingly it was decided to secure personal interviews with all the men soon after they had returned to uncontrolled eating. Under ordinary conditions trustworthy introspective statements on this problem would be exceedingly difficult to obtain. The reasons why this is true are, of course, obviously due in large part to the prudishness of our education in regard to sex matters. The ordinary normal individual is not willing to reveal the facts of his own sex life and finds difficulty in taking an objective attitude in reviewing them.

It is important to emphasize the difficulties which usually surround the collection of trustworthy sex data, for it so happens that they contrast sharply with those which were fortunately present in our research. The attitude of the Young Men's Christian Association on knowledge of sex is well known. No other organized group of men outside the medical profession has treated the subject in such a straightforward and frank manner. Both in the schools over which they have control and in their service for men in clubs, gymnasiums, and now in army huts, they have labored to establish a sane view of these things and to place private and social hygiene on a sure footing. At the International Y. M. C. A. College at Springfield, especially, it has been recognized that each secretary and physical director must have a sound and wholesome attitude regarding these important matters, if he is to be of maximum service to the Young Men's Christian Association. Thus the subjects of our investigation were accustomed to regard and discuss sex matters from a different point of view than would be the case with almost any other group of men. These men were neither prudish nor vulgar minded. They were a clean group of honest, virile fellows with no venereal diseases.

As noted in a previous paragraph the low diet experiment ended for Squad B on January 28 and for Squad A on February 3. A few days later, i. e., on February 8 and 9 in Springfield the men were individually interviewed regarding changes observed between the conditions of reduced diet and uncontrolled eating. It is a great satisfaction to be able to state that throughout this long investigation the relationship between subjects and experimenters was most cordial and the intelligent coöperation of the men was never lacking. They were therefore not surprised at our unannounced appearance and readily consented to arrange interviews. The topic of sex was given no preliminary mention and all surrounding conditions were entirely appropriate to holding such personal interviews. Each conference was begun by discussing the topics of clothing and cold,

ability for physical and mental work, and the condition of the stomach and bowels when on the uncontrolled diet in contrast to the conditions prevailing during the experiment. The men discussed these matters freely and full notes were made. Finally it was asked if in the contrast between low diet and uncontrolled eating before or after the experiment they had noticed any change in the sex desires and interests. Before a man could reply to this question it was pointed out to him that suggestion and introspection are particularly prominent factors influencing sex interest and that therefore it was not deemed wise to question on this topic during the experiment. Since however, the matter is of importance physiologically and sociologically, it could reasonably be mentioned at this point and any personal, candid opinion the subject might be willing to express concerning his own case would be thoroughly appreciated and considered as confidential, should that be his desire.<sup>2</sup>

Following the first direct answer by the subject, he was asked to make his reply more specific under such topics as nocturnal seminal emissions; tendency to erection; desire and sex appeal at dances and occasions of association with women; sex appeal of shows, pictures, and books; and any other conditions peculiarly individual where sex might be a recognized factor. Furthermore, he was asked to give any comments concerning dreams. Every effort was exercised to make the questions neutral. It could in no wise be anticipated what the group of interviews would reveal for the man who had mentioned the topic was only one of twenty-four and quite conceivably his opinion was the result of some suggestion. In no instance did a subject take the matter as a joke, refuse information or object to having anonymous notes published. During the interviews one had the impression that the men were stating what they believed to be true.

Before summarizing the results of these conferences and at the risk of considerable repetition in the statements the pertinent comments of individual subjects will be given in their own words:

A:<sup>3</sup> "Yes, I think there is a relation between the low diet and the sex interests. I can make it clearest by telling you my circumstances. This winter, I make on the average two visits a week to my fiancée. Before the experiment, when with her, I noticed (I hope she did not),

<sup>2</sup> The personal interview appealed to us as a more satisfactory method for the collection of this information than to use a questionnaire. The resulting statements are not quite so orderly nor is each question always specifically answered but the main facts are present.

<sup>3</sup> The subjects in chance order are designated by letters, without regard to their real initials, and with no reference to the numbers they may have had while serving as members of Squads A and B. The first twelve men, i. e.: A to L inclusive belonged to Squad A, the remaining were in Squad B.

much sex stimulation, tendency to erection, etc., upon kissing her and embracing her, and practically every morning I had an erection. Nocturnal seminal emissions occurred I suppose, on the average, once a month.<sup>4</sup> During the diet experiment there was no emission that I can recall and I believe, no erection. My roommate at the college noticed this and one morning he said, 'Gee! you have lost all your manhood.' When with my fiancée during this period, nothing of a sex nature would come into my mind; I think that if I had not been engaged, I would have left off going out to visit *the lady* or attending any social function, in fact, I was quite astonished, and wondered at the change that had come upon me, for normally I liked very much to go with the girls, and I know a rather wide circle of friends about this community. I spoke of the matter somewhat with my roommate, and told him that I felt a changed condition. He agreed that the change was noticeable. It has been so long since I had a sex dream that I have no recollection of any. Since the close of the experiment there has been no special change, as the days have been too few to pass any judgment on them. I noticed a diminution in the sex appeal of vaudeville shows during the diet.

"There were, I believe, two or three dreams of food during the experiment; one, a week before it closed. I cannot remember them in detail to report them. Recall no sex dreams while on diet."

B: "I would be willing to swear that a low diet, such as we had in the period of experimentation, greatly reduces sexual feeling. I noticed this condition in myself before talking with anyone about it. Before the experiment and since erection is common in the morning until one gets up and empties the bladder. While on the diet there were no thoughts of sex. I had no interest in going out with the girls which seems very strange to me now, as I look back on those months. Jokes and stories which might commonly have a sex appeal were absolutely devoid of interest. I noticed this particularly. I do not recall any dreams of sex or food, in fact, the dreams that I ever recall, are very few."

C: "I think perhaps sex tendencies and desires were less during the period of diet. Am in doubt if there was any nocturnal emissions during that period. An emission occurred on Monday or Tuesday morning after the uncontrolled eating began. No dream that I can remember; I very seldom dream, and do not try to recall them. While at home Christmas time I was eating rather heavily. In association with some ladies then I noticed distinct tendency to erection." No other statements made.

D: "During the low diet experiment my sex desires were never aroused, especially after we got well into the experiment. I cannot re-

<sup>4</sup> The physiologic normal for frequency of nocturnal emissions in sexually abstinent males is commonly given as one to four per month. (See Chatwood, *The Practice of Urology*, 1913, New York, p. 507; Barker, *Monographic Medicine*, Vol. 4, 1916, New York, p. 281; Ellis, *Studies in the Psychology of Sex*, Vol. 2, 1902, Phila., p. 251.)

member a nocturnal emission within a year; have not been out with the girls since two evenings last summer; there has been no tendency to erection in the morning, at least I cannot remember an erection. I do not associate the reduction in sex energy with any one period of the experiment, but know that with the experiment there has been a definite decrease in sex tendencies."

*E:* "I am very definite in the conviction that there is a reduction in sexual desire during the period of low diet. During the time of losing weight there was the least irritability. I think the kind of food affects sex appetite—meat causing stimulation of it. Do not recall any nocturnal emissions during the diet. Before the diet these were rather frequent. I have usually to put up a pretty stiff fight against the sex instinct, and noticed that it was not nearly so difficult to control during the period of the experiment. I slept better; love scenes had less affect upon me. The observations given are based upon a comparison of the diet period with the previous normal. The days since the experiment ended are too few to form much of a basis for comparison."

*F:* "I independently observed that in my case the sex desire was less during the period of low diet. When under that condition I would not give a girl a second look and was surprised at my lack of interest. Nocturnal emissions had normally occurred twice a month or oftener during the previous school year. There were not more than two during the whole course of the experiment [four months] and none in the few days since. One of these during the low diet occurred on a morning off when I slept late and did not have to go to the laboratory. I noticed this marked decrease in nocturnal emissions during the diet and think that it is possibly due to the fact that the bladder in the morning was not usually as full, since I mostly got up at an earlier hour than is my habit. This morning, for example, at 4:30, I was awakened by a strong call to urination, the penis was fully distended, but, I believe, because of the irritation of a full bladder. The other nocturnal emission during diet happened right at the first of the period. I recall no sexual dream. I have no shows or dances to report on. Am engaged to a girl at home and only have two girl friends in Springfield, so do not give much for the girls. I was home at Christmas time and saw my fiancée but cannot recall that there was any particular noticed difference. During the experimental period the seniors were studying 'Beginnings of Religion,' and in class, were speaking of the forces of food and sex. It was jokingly remarked that in the case of some Squad A men at present the sex appeal was very slight and the food very strong."

*Dreams.*—"As I recall, there were about three food dreams during the period of experiment. The last one was two days before the experiment ended. I dreamed of taking some food in Wood's Hall (the mess hall) and was very much bothered to think that I had broken over the restrictions, and greatly relieved at waking, to find myself only dreaming. Think dreaming in general was much more frequent before the diet

began, but as I noticed that my dreams are mostly in the morning and since I awoken earlier for the experiment when on the diet, this may account for the less frequency of dreams."

G: This subject was absent from the city. In answer to a letter of inquiry asking, "Do you think the low diet has any relation to sex desire or activity" he wrote in reply: "Have not thought of it, before, but it seems on reflection, that the sex impulse was perhaps less. Nocturnal seminal emissions were not quite so frequent. Can recall but about three during the entire experiment. There were no sex dreams that I can recollect. I do not recall any difference in tendency to erection.

"As I think of the problem, it would seem that in a very subtle and hardly noticeable way there was a tendency to less stimulation but cannot name any more specific instance or incident."

H: "My opinion is that sex desires are less while on low diet. I did not talk over this subject with any one during the experiment. I sleep only as much as is needful and nocturnal emissions are very rare. I have no idea when the last one occurred. I think I work so as to consume all my energy, and this is perhaps the reason that nocturnal emissions are rare with me. While on diet there was almost never any tendency to erection in the morning, but I was nearly always up early—about 4:00 A.M., so that the early rising may have been the cause of reduction in this tendency. Have not noticed any change since the end of the experiment. There were never any dreams of food or sex that I now recall."

I: "There is certainly no increase in sex interests and tendencies with the period of the low diet. It has been so short a time since the experiment ended I should prefer to wait to observe myself and will write you." In a letter dated March 31, 1918, the following statement is made: "I have tried not to give the matter any special attention, but the following condition was observed since the close of the experiment: A decided increase in the number of night seminal emissions. (actual number not noted); more frequent erections and sexual excitement.

*Dreams.*—"There were times when I dreamed of eating food or rather of being just about to eat food, when I would awaken in great alarm at the thought that I was going to break the diet. This type of dream occurred many times with me."

J: "I observed that nocturnal emissions were almost entirely absent during the low diet. Normally with me they occur once a week or more frequently. Near the middle of the experiment I went for more than a month without having one such occasion. When later on uncontrolled eating sex tendencies have been extremely strong and the frequent emissions have returned."

K: "The most definite change in sexual matters noticed during the diet period was that stories and suggestive jokes where the sex element might have been prominent were repulsive. I was surprised at this. There were only two seminal emissions during the period and normally



I should have expected a somewhat larger number. I recall no sexual dreams and observed no change in tendency to erection."

L: "The low diet experiment just about unsexed me; during the first two weeks of the period there was at the end of each week, sexual intercourse, but at these times there was not a keen desire or passion, nor did the occasions produce the normal pleasure commonly associated with them. I thought to myself, how foolish to indulge in this simply by habit. During this period, I slept with my wife, as previously. She always sleeps on my right arm and we fit together very tightly in the closest possible contact. She never takes the initiative in sex matters, but, also never objects, and during intercourse becomes thoroughly aroused. There were a few times, as I recall, when I did not lie so close to her, since I did not like to make her cold, and she complained of my body being cold. I believe she did not try to avoid sexual appeal to save me, thinking that my energy was being severely taxed. I noticed that the penis was very shrunken and contracted. It reminded me decidedly of my father's when he was old.<sup>5</sup> During a week at camp at Christmas time the penis was noticed to be larger and returning to previous condition with the greater amount of food. I gained thirteen pounds in weight. Upon returning home, had there been any passion or sexual desire there is no reason at all why it should not have been gratified and I wondered, upon returning home, after this experience, and having no sexual desire or care, how long it would be until such desire did again return. I will write you when it does. Nude pictures or nude life does not bother me since I had quite a good deal of experience with models in learning to paint.

"There has been, I believe, a slight seminal emission at times, in connection with a severe constipation, which I had during the experiment, but no nocturnal emissions as such. I do not recall a dream of a sensuous nature during the period. Hence, it seems to me that there is a very definite relation between our low diet condition and a reduction in sex desires as given in my first statement."

A letter received from L. dated February 17, 1918, contained the following statement: "I have no definite knowledge that saltpeter was used at camp. Toward the last of the three days I observed an increase in size and distention of the penis that suggested a return to normality, but cutting diet as soon as I returned home, kept me tame enough."

"First sexual intercourse ten days after close of the experiment, provoked, I think, by contact more than by desire or intention."

*Dreams.*—"Three dreams of food within the last month I recall in detail: (1) a neighbor's cow invaded my garden plot and I deliberately killed and cut her up in large sections that were very pleasantly and attractively fat. Then I cut huge slices, and fried and ate them ravenously. Finally I had compunctions of conscience and took a huge slice over to

<sup>5</sup> Dr. H. W. Goodall, who made careful clinical examinations of the men, recorded no such change.

my father's home, explaining that they could have it for five cents a pound, then I confessed it was their cow and that I killed and ate all I could; (2) the following night I dreamed I ate dish after dish of food like we had from the commissary when hiking and camping. It was a sort of a predigested hash. I ate enormously until I awoke; (3) I dreamed of having only meager cold food, and in a henhouse. I tried in vain to get a fire to warm it, then I asked my brother if I might not breakfast with his family and waited several hours for them to cook it. Finally he told me that the small mess of cold food was all that I could have."

M: "I am sure that during the diet period sex desires particularly, as associated with the attractiveness of dances and one's interest in the opposite sex were decidedly less. At a dance attended during the diet I noticed no sex desire or irritation, which was quite unusual for me and impressed me that there was a change of some sort. Another thing which I might mention incidentally is that I could not sweat or get warmed up, which is an unusual thing as I sweat easily, under normal conditions. During the diet there were no nocturnal emissions. Since the diet has ended there has been none, and before the experiment they came about twice or more per month. Have no definite idea as to the frequency of erection or any changes of this character associated with the diet, except that there was no such experience at the dance. No dreams to report on. This is absolutely independent judgment. I have not talked over the matter with any one except yourself."

N: "I noticed a definite change in my mental attitude to sex. There was much less interest and attention to it during the period of diet. So far as I know there weren't any nocturnal emissions for some time before the experiment, during the experiment and since. I think that there were no erections during the diet but there have been some since. It is in this that I have noticed the change particularly and the erections since the experiment were not at all associated with full bladder. Girls have never caused much sex appeal to me, but it was surely less during the experiment. This is the first time that I have talked over this matter with any one, but I had noticed it in myself independently. There was no occasion during the diet for trying to substitute other things in place of sex thoughts. No shows, parties or dances to report on."

O: "Am very positive that sex activities and desires were less during the period of diet. Nocturnal emissions are usually fairly frequent with me, i. e., two, three or more per month, and they usually caused me to waken. During the diet there was one emission, about the middle of the second week but it did not waken me. I discovered the fact the following morning and was rather surprised. Emissions are much more frequent, now that I am eating heartily. There was one dance which I attended during the period of the diet, and one since, but no sex contrast is prominent in my mind, in fact, I am not a good

enough dancer to think of anything but the dancing. During the last two weeks of our diet, I had several invitations to social occasions, but did not care particularly to see the ladies. Now it is very different indeed."

*P:* "With the low diet I think in general the sex activity is reduced. During the experiment I heard one of the subjects speak of the matter in relation to his own case. This led me to watch myself. There was one seminal emission in the first week after diet began but absolutely no sex irritation or desire from then until the end. Since the diet I have had two emissions. Such events are not associated with dreams which I can recall. I have a vague memory of one food dream but none concerning sex during the experiment. On the last day of the diet period I attended a 'movie'; the subject was such that under normal conditions I might have felt considerable sex stimulation. None was present. A man who was with me reported sex feelings and that night had a seminal emission."

*Q:* "The possible relation of sex activities to our diet experiment first came to my attention in the course in physical training. The professor in charge was speaking about a low protein diet as being commonly supposed to produce less sex irritability. He asked Mr. C, a member of Squad A, who was in the class if he had noticed any change in relation to the diet experiment. This man gave a rather indefinite answer, but I thought immediately that in my own case, the change was definite, although my attention had not been so specifically directed to it before. It seemed to me when I analyzed it that during the diet, sex was repulsive. I had no emissions and no erections, but after eating uncontrolled, both of these were frequent. The change, considering the short period of dietetic reduction was more than I would have believed. The change in sex made the greatest impression on me; the feeling of cold, next. There was not much weakness during the diet; I could do any exercise in the gymnasium that I could do previously." The subject was asked if he considered it unusual for a professor or instructor to ask such a personal question that was put to Mr. C in the course in physical training (incident mentioned above). "Why no, it was all right for him to ask such a question. The attitude here at the college is very frank and above board in relation to sex matters."

*R:* "I think a perfectly fair judgment would be that sex desire was more prominent when eating heartily. Had to confine myself more during the diet, and the routine was favorable for controlling sex activities. There was not so much outside associations which is everything with me along that line. Emissions are normally very seldom, not even once a month, I believe. I recall none before, during, and none since the experiment. There has been more of a tendency to erection since the experiment, but I think this is associated with full bladder. While on diet, I attended to the urine better and got up earlier. No dreams of food or sex. There was one dream of a death episode following taking of poison."

S: "It seems to me that during the last week of the three weeks' period of diet there was less flow of blood through the sex organs. They were less irritable and there was much slighter tendency to erection and not in reference to any particular time of day but through the whole day, there was an absence of sex sensation. There was one emission near the first of the diet—I think about the fourth day, and none during the rest of the period. There has been one since the diet has broken—the second day after uncontrolled eating. I noticed these things in myself and remembered some things which I had read in connection with diet in a magazine. I remember no dreams, except those of the last two nights and these did not concern food or sex. Am seldom out with the ladies and did not notice any change in attraction of the opposite sex. Shows were not nearly so attractive during the diet. Did not seem to think of the sex side of jokes and love scenes."

T: This subject was absent from the college on February 8 and 9 and so answered a written query sent him later. The question, "Do you think the low diet has any relation to sex desire or activity," is not answered specifically. His most definite statement concerns nocturnal seminal emissions. There were none of these during the three weeks of reduced diet, and he says, "Since I have been on the full diet night emissions have been frequent. I might say that the first time I was measured up in Boston [DuBois body measurements, with subject nude, at Nutrition Laboratory], I was very sensitive, and had an emission while being measured. When I was measured finally on the last day of the reduced diet on our last trip, I had no such sensitive feeling and there was of course no emission." No changes were noted in tendency to erection; sex appeal at dance or social function; sex appeal at shows or other conditions where sex might be prominent. All of these are marked "no" or "none."

*Dreams.*—"The only dreams I used to have were about eating. Several times I thought that I was breaking the rules, that Doctor Roth gave us, but always to my surprise, I woke up in bed hungry."

U: This subject was asked just the same questions that were given the others. He said in reply, "Last summer, at camp, I waited on table for two weeks. There we were given heavy doses of saltpetre in the coffee and in the bread, big doses at first and smaller doses later, the idea being to reduce sex activities, and irritation. Working in the kitchen, as I did, I knew positively about the matter, and can state that sex desires were indeed greatly reduced. The men with whom I worked were a rough bunch and talked about such matters all the time. They all agreed that the saltpetre had a definite effect. I attended dances and danced with girls who danced in very unusual positions which were especially calculated to provoke sex irritation, but in my own case, they had absolutely no effect upon me. In fact, I could not get an erection in myself. The saltpetre seemed to produce more urine however. When I went to camp I had a night emission the first night I

was there. I had to sleep in my clothes. Now I do not know if the diet given in connection with the Nutrition Laboratory experiment contained saltpetre in order to test the matter, but I noticed a similar change was produced by it, although it was not so great. There would occasionally be an erection during the three weeks' period, but not nearly so frequent as before or since. Erections are very common on waking, before and since the diet experiment, and I am now getting up just the same time in the morning as during the diet experiment. I think near the start, there was one night emission, and none during the remaining days. There has been one since. In general, these have been becoming more infrequent with me during the past year and a half. During the experiment there was no thought of the opposite sex; no desire to be with them, particularly in the last two weeks. Do not recall any dreams of sex or food in connection with or during the diet experiment. While at camp I had much idle time. I was not so idle of course during the experiment at the college and I was naturally thinking more of food during the latter period."

*V:* His first general observation was that there was no particular change in sex with the diet. Later however, he modified this when considering specific factors. "Usually there are one or two emissions per month; there was one during the three weeks' period of diet. I remember none since. Am not a dancer, so have nothing to report about that. While on the diet, there was, however, not so much of a tendency to erection. There were one or two erections possibly. I noticed their infrequency in myself. I did not discuss the sex matter with anyone. There were no sex dreams on diet and these are not usually associated with nocturnal emissions. Here at the college I am much away from the other sex. I have a girl at home and am not particularly anxious to associate with those here; moreover, I have definite study duties. From the standpoint of the infrequency of erections, I believe there is a difference in sex tendencies, amounting to a reduction with the low diet."

*Dreams.*—There were no night dreams of food during the investigation. There were lots of day dreams however.

*W:* This subject had left the college at the time of these interviews, February 8 and 9. In answer to the written query, he wrote as follows: "I most emphatically believe that the sex desire is reduced with a low diet. As soon as the diet was over all sex activity came back inside of two days. There was only one nocturnal emission during the three weeks of diet, and that was within the first week. This is a very small number as normally they are quite frequent. I did not have any sex dreams during the period of three weeks, and very little tendency to erection. I called on a girl twice during that period and I was as 'dead' as a wooden Indian. My mind was absolutely clean for the period of the diet. No sex thoughts came into the conscious field to remain more than a few seconds. This is unusual for me."

X: "Have no definite idea as to any change in sex with conditions of diet. Nocturnal emissions usually occur about once in six weeks. There were none occurring during the three weeks' period of the experiment. Have not discussed the subject with anyone. There are no definite changes noticed in the tendency to erection. Cannot remember of having dreamed more than six or seven times in my life. Sleep only five or six hours, which is rather sound sleep and am up early. Have not attended a party or dance in a long time. But few shows attended and noticed no difference here, at least, can remember none."

TABLE I

THE SEX EXPRESSION OF YOUNG MEN LIVING ON A LOWERED NUTRITIONAL LEVEL

Opinions Concerning Sex Activity	Men Interviewed on the Subject,																								Total Re- porting
	Squad A, on Diet for Four Months												Squad B, on Diet for Three Weeks												
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	
1. General sex interest:																									
Decreased .....	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22
Unchanged .....																								X	1
Increased .....																									0
2. Number of nocturnal emissions:																									
Decreased .....	X		X		X	X	X		X	X	X		X	X	X	X		X	X	X	X	X	X		16
Unchanged .....			X					X					X			X					X	X	X		6
Increased .....																									0
3. Frequency of erection:																									
Decreased .....	X	X	X					X	X	X		X	X		X	X	X	X	X	X	X	X	X		13
Unchanged .....								X			X		X										X		4
Increased .....																									0
4. Desire for association with the opposite sex:																									
Decreased .....	X	X	X			X					X	X	X	X						X					9
Unchanged .....																									0
Increased .....																									0
5. Sex appeal of dances and social occasions:																									
Decreased .....	X											X									X				3
Unchanged .....						X							X												2
Increased .....																									0
6. Sex appeals of shows, pictures and stories:																									
Decreased .....	X	X		X						X				X		X					X				7
Unchanged .....															X							X			2
Increased .....																								X	0
7. Reports of sex dreams																									0
Reports of food dreams .....	X			X			X		X		X			X							X				6

The foregoing comments of the men may conveniently be grouped under headings for manifestations of the sex instinct.



Table I is an attempt at such a grouping. Each man, A to X, has a vertical column in the table and in this column a designation is placed opposite each point which is covered in his report. Occasionally it has been necessary to be a bit arbitrary in classifying the remarks as may be seen by comparing the table with the quoted comments. It was not practicable during the interviews to record everything the men said and as the time available for each conference was limited to about twenty minutes for all topics, including sex and the matters spoken of introductorily, some points were occasionally not very thoroughly covered and hence there is not a full quota of answers.

General sex interest is reported to have been decreased by the low diet in 22 of the 24 cases. Many of these men said they were absolutely certain of the decrease. Two of them, C and G, used the word "perhaps." Subject T did not answer the question directly and X found no change. Nobody believed there was an increase. Referring again to the table it will be seen that 16 subjects were convinced of a decrease in the frequency of nocturnal emissions, 6 observed no change and there were none who reported greater frequency. Of the 13 men who mentioned decreased frequency of erection some thought the early rising and emptying of the bladder in connection with the experiment might in part account for this, while others were convinced that without respect to time of day the external genitals were less sensitive and irritable while the reduced diet was in force. Four other men could recall no change in the frequency of erection.<sup>6</sup>

The more fragmentary data on topics relating to association with the opposite sex is likely due to outside circumstances. We are dealing with subjects in attendance at a men's college, the opportunities for association with women were naturally limited. Of the nine reporting on topic 4, desire for association with the opposite

<sup>6</sup> An anonymous article, Nocturnal emissions, *Amer. Jour. Psychol.*, 1904, Vol. 15, p. 104, reports the case of an unmarried man in good health and supposedly normal who kept complete account of the frequency of involuntary emissions during the age period, 30 to 38 years. The yearly average was 41, not quite one per week. "While both the amount and the frequency seemed to be influenced slightly by conditions of temperature, food, sexual excitement, etc., the influence was only temporary and made no difference in large periods of time. It has been said that urinating will relieve the pressure and quiet erection. I gave this a fair trial for a long period and found no difference in the net result, though sometimes an emission might be thereby postponed a day or so. . . . Illness, however, or poor condition, as also overwork and loss of sleep, certainly tend to make the emissions less frequent. . . . If I went to bed late very tired or unable to sleep much for thinking, the usual morning erection would generally not take place. . . . Throughout these years my health has continued very good with rare exceptions. . . . and my weight has varied but little."

sex, all specify a decrease in the attractiveness of the girls. The sex appeal at dances and social functions is reported decreased in three instances, unchanged in two and increased by none. Only a few of the men had the time or were in the habit of attending dances and the report is therefore not full here.

Subject K was surprised that during diet stories and jokes containing a suggestive sex element became repulsive. Altogether 7 men reported a decrease in the sex appeal of shows, pictures and stories, while there were 2 who saw no change.

Nobody remembered having had sex dreams, notwithstanding the fact that many recalled having had one or more nocturnal emissions during the period of the experiment. There were 6 who could recall having dreams of food. Frequently the situation in the dream was one in which they were about to break the diet rules.

It is remarkable that no subject mentions an increase under any of the topics considered. One man, X, consistently reported no change, but the very large majority are in agreement that nearly, if indeed not quite all the usual manifestations of the sex instinct were less than normally prominent during the reduced diet period.

The one married man, L, used the term "unsexed" in describing the low diet effect on himself.<sup>7</sup> His report needs no comment. He spoke freely on the subject and was absolutely convinced of the results. It is regrettable there were no other married men among the subjects, and that others of them were not so situated as to call on their fiancées regularly during this period.<sup>8</sup>

At the date of the interviews, February 8 and 9, although the interval since the close of the experiment had not been long, some of the men reported having experienced, under the unrestricted diet, a definite return to normal sex interest. This manifested itself particularly in more frequent nocturnal emissions and in a desire to associate with women. The men insisted they had essentially as much to do following the experiment as during it and that the difference was not because of increased leisure. On a later date, May 21 and 22, 1918, in interviewing some members of Squad A on other matters they were given opportunity to modify, if they desired, the statements previously made on the topic of sex and the reduced diet.

In each case they confirmed the previous report, stating more

<sup>7</sup> It is commonly known that diabetes and extreme obesity are causes of sexual impotence. These pathological conditions of nutrition must, however, not be confused with the change produced in the subjects of this investigation.

<sup>8</sup> Within a short time following the experiment seven of the men of Squad A were married.

emphatically even than before their conviction, that associated with the physical condition resulting from the low diet there was a diminution in sex activity.

We have emphasized the favorable conditions surrounding the collection of these data. The men are believed to have been sincere in their statements. We must recognize, however, that some subjects had no doubt been partly influenced by outside suggestion. They had spoken with roommates or heard L mention the topic and one or more instructors in the college had in certain courses expressed the opinion that a low protein diet was most favorable for controlling the sex instinct. Thus it has been brought to the attention with a suggestion as to the direction of change. On the other hand these men were fairly mature and able to form opinions of their own. They knew that the experiment was not one specifically on low protein; it was a change in the quantity rather than the quality of diet. As a matter of fact Squad A men were receiving on the average about 65 grams of protein in the daily ration. There was no conceivable reason why they should all endeavor to tell the same story. The one questioning them was entirely open to conviction. Several of the men professed to have had no conversation on the topic until the interview and each in turn was requested to refrain from mentioning the sex side of the examination to others until all the conferences should have been completed.

It would appear rather questionable if the data on frequency of nocturnal emissions would be much if any influenced by the factor of outside suggestion. There is thus an objective side to the evidence which makes it trustworthy. If we had only the general accounts from the members of Squad B who were on diet twenty days the case would not be so strong. Intensive application to any new and more or less exacting duties may temporarily diminish sex interest. The experiment could hardly retain control of attention to the exclusion of instinctive interests in the members of Squad A for so long a time as 4 months. Hence it seems only fair to conclude from the uniformity and character of the evidence that these introspections have considerable basis in fact.

No other studies familiar to us on so-called "under nutrition" have reported data on this subject. It seems aside from the point to draw comparisons between our data and those obtained under conditions of complete fasting as in the case of the subject fasting at the Nutrition Laboratory for a period of 31 days.<sup>9</sup> In connection

<sup>9</sup> Benedict, *A Study of Prolonged Fasting*, Carnegie Institution of Washington, Pub. No. 203, 1915. A great many of the dreams of the fasting man were of a sexual nature. There were several nocturnal emissions. But it appeared that he was naturally interested in sex. Also see notes on p. 303.

with this fasting there was developed an acidosis which tended to keep the metabolism up to normal level.<sup>10</sup> Another consideration is worthy of mention, the usual fasting individual leads a much more sedentary and meditative life than was possible for the men in the low diet investigation. This data, at present, must therefore stand without direct contradiction or confirmation from other studies on human subjects. However, we are by no means on new territory when we connect sex and metabolism. Riddle,<sup>11</sup> and other research workers studying mostly lower animals have shown that sex is closely associated with metabolism and is probably more or less dependent on the metabolic level. By changing the latter they have been able to modify the former. It is commonly believed that the sex instinct is stronger in men than in women. The large amount of metabolism data from this laboratory and other institutions has proven that the basal metabolism per kilogram of body weight of men is higher than that of women. It is not on this ground illogical that a lowered metabolism in men might reduce the manifestations of the sex instinct. Nature may require a high metabolic level for purposes of race propagation. Obviously we are venturing somewhat into the field of speculation in discussing the matter from this more generalized point of view. But there are a number of biological relations which could be mentioned in this connection and the introspective results from the low diet subjects seem confirmation of these lines of evidence that have lately been presented.

In conclusion, any dietetic regime which, even though it affects the external appearance and performance of an individual but little, definitely lessens the expression of the sex instinct, causing one sex to take but little interest in the other, would seem to be disadvantageous to the species if indefinitely prolonged and if the instinct made no adjustment thereto. Any general conclusions regarding a lowered nutritional level produced by prolonged reduction in diet may not disregard the effect on the sex instinct or its manifestations. On the other hand the results clearly indicate a method of treatment for achieving restraint of sexual tendencies in pathological cases of sexual dissipation.

<sup>10</sup> In spite of the acidosis the basal metabolism did decrease somewhat per kilogram of bodyweight.

<sup>11</sup> Riddle, *Lectures on Heredity*, Washington Acad. Sci., 1917, p. 319; see also Chavigny, "L'invasion des rats aux tranchées pendant la guerre de 1914," *Revue Générale des Sciences*, 1918, p. 397.

## Society Proceedings

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### NEW YORK NEUROLOGICAL SOCIETY

THREE HUNDRED AND SIXTY-FOURTH REGULAR MEETING,  
TUESDAY, APRIL 2, 1918

The President, Dr. FREDERICK TILNEY, in the Chair

#### CEREBELLAR PROBLEMS

Dr. T. H. Weisenburg, of Philadelphia, delivered this address in which he presented the results of his observations in the study of this subject, both in clinical cases and in operative and postmortem findings during the four years following his first presentation of a tentative localization of cerebellar impulses, illustrating by a chart the position of various centers for different clinical manifestations of asynergia. So far as was known this had been the first attempt to solve the problem, but cerebellar localization was now an accomplished fact, whether accurate or not remained to be proved. The conception was that the cerebellum was a motor organ, its function being to synergize all movements of the body, the centers for the direction of movement being located in the cortex. The direction of the movements of the lateral limbs was controlled in the lateral lobes of the cerebellum; these were subdivided, the superior portion controlling the upper limb and the inferior portion the lower limb. The center was further subdivided for the direction of the limbs upward, inward, outward, and downward, and still other subdivisions could be made. The centers for the movements of the trunk and the head were in the vermis. In the superior vermis were the centers for the movements of the upper trunk or shoulder girdle, and in the inferior vermis those for the lower trunk or pelvic girdle.

The problem of cerebellar location was of so much importance that this tentative selection of centers, as charted, was accepted and the study carried on in the attempt to prove or disprove the assertions, chiefly by the observations of individual cases of cerebellar disease with the aid of moving pictures. The attempt was made by selecting cases, studying them very carefully, localizing as much as possible the limit of the asynergy in the limbs and identifying what was found clinically with pathological operative material. If there was any advance to be

made in this direction this course was probably the only one to follow. So far no other advance had been made in cerebellar localization. Up to six years ago the speaker had shared the usual conception of cerebellar disease and cerebellar symptomatology. He assumed that every patient with cerebellar disease had so called cerebellar ataxia, took it for granted that a certain number had vertigo, a certain number had not, that nystagmus might or might not be present, that the gait was of the drunken type, and, later on, after Babinski's researches, that a certain number of cases had asynergy, all had adiadochokinesis and certain others had hypermetry. This conception was still held by most individuals. The moving picture was the best method of observing the cases, for in this way massive exhibition of the gait, station and movements could be studied seriatim, enabling one to form more adequate conclusions as to the actual and individual picture presented.

Another important adjunct to the study of cerebellar disease was furnished by the Barany method. In this country the work of Major Isaac H. Jones and his associates had led to an increased interest in cerebellar localization. One of the greatest advantages of this had been in the standardization of aviation tests, through which many physicians throughout the country had become more acutely aware of the fact that there was a vestibular apparatus and of its connection with cerebellum and brain. The interest thus aroused promised well for further fields of investigation and was also valuable in that it cemented the interest, being a common one, of two branches of medicine, neurology and otology.

As far as the cerebellum was concerned and the symptomatology, the speaker believed it the business of the cerebellum to synergize all movements; it was a local organ and its function was that of coördinating the impulses from the cortex. In discussing cerebellar symptoms one was referring to lack of synergy, everything else being dependent on this one primary symptom. Therefore, disturbances in station, gait, or movements were only types of asynergy and these depended upon what particular part of the cerebellum or its connections was affected. It was an error to state that in cerebellar disease the patient always staggered backward; some staggered forward and some to the side, dependent on the way the trunk inclined. Another erroneous statement was that which claimed that adiadochokinesis was not always present in these cases; in any cerebellar involvement of the limbs it was always present. The whole group of symptoms, on analysis, could also be revised. For instance, the term cerebellar ataxia was not a good one. The word ataxia should be used only where there was disturbance of sensation; it should be limited to sensory disturbance. All disturbances of gait or movement of limbs should be termed cerebellar asynergia, and study of the case would show in each individual what limb or what part of the limb or in what direction the limb was asynergic. The cerebellar gait



was a trunk gait which was entirely different from the drunken gait which it was so commonly termed. Comparison of the two with the aid of moving pictures would make this very clear.

In different types of cerebellar patients there was a distinct difference in the behavior of the trunk, in the matter of station, and in the involvement of the limbs. In some the trunk was involved in all but the shoulder and pelvic girdles; in others vice versa. In those in which the pelvic girdle only was involved the patients had the greatest difficulty in standing. In many patients, however, the station was not altered a great deal; this applied to those in whom the shoulder girdle only was involved. Then there were patients in whom there was no involvement of the trunk to speak of, with only one arm or leg affected; here the station was not affected at all. In a great many patients it was found that the arms moved nearly always inward and not outward, or outward and not inward. This tendency could also be observed in the lower limbs. There was a definite reason for all this and that was why this cerebellar localization had been charted as it had. Success in proving this chart accurate by study of cases and coöperation at operation or postmortem had only been partial. It was not intended that the chart should be accepted as being exact, but it was a beginning at solving the problem and remained to be proved or disproved. By means of certain freezing experiments Barany found out that certain movements of shoulders, arms, etc., came from certain parts of the cerebellum. The cerebellar patients should be carefully observed and studied in the minutest detail, remembering that the cerebrum compensated for the cerebellum. It was very easy for the cerebellar patients to be taught to make almost normal movements. The Barany tests, the moving pictures and such other means as presented themselves should be availed of, for the importance of correctly localizing the cerebellar centers was one that opened a field of fascinating interest in addition to the possibilities of its usefulness.

#### AVIATION PROBLEMS, WITH SPECIAL REFERENCE TO THE INTERNAL EAR AND THE CEREBELLUM

Major Isaac H. Jones, Medical Corps, U. S. Army, of Washington, D. C., addressed this subject both from the point of view of the physician and of an officer in the aviation service. The relation of the internal ear to aviation was beautifully illustrated by the experimental work of Dr. Pike, of Columbia University, who found that dogs, after their internal ears had been destroyed, were still able to be "infantrymen," but were unfit to be "aviators." They could walk and run satisfactorily, but if they were called upon to jump into the air over a stick they came down in a heap on landing. Doctor Weisenburg had stated in his address that the neurologist would do well to secure the help of the otologist in the diagnosis of cerebellar cases; on the other hand, it seemed to the speaker that the otologist would be very unwise if he attempted in the

short span of a lifetime to make a neurologist of himself. It was the close coöperation between the neurologist and the otologist that made the work possible. The controlling influence that the ear had over every portion of the body musculature was apparent when one realized that douching the right ear with cold water caused a pastpointing of even the left foot to the right. The Barany tests had made possible the realization that in testing the internal ear one was at the same time testing an infinite number of nerve pathways in the central nervous system and in the nerve distribution to all portions of the body. The internal ear, as the sense organ of motion perception, had, therefore, a much broader significance than the ear as the sense organ of hearing. In order to appreciate the part the ear mechanism plays in aviation, all that any physician needed to do was to take a flight in an *aéroplane*. As he guided it in a straight flight his incessant effort was to correct minute deviations from the level position; the countless and continuous changes of movement in all directions were counteracted by tiny movements of the joystick. In his first flights, when an instructor was guiding the plane, he watched the joystick in front of him and he noticed that it was moving, ever so little, this way and that, in response to stimuli in the detection of changes of position. This sense of the "detection of movement" was what the experienced aviator called "the feel of the ship"; it was that sense which distinguished between the born flier and the mechanical flier who was forced to rely upon his sight in the guiding of the plane. The Almighty gave certain sense organs to man; if there was any individual who preëminently needed a normal sensing of movement it was obviously the aviator.

The turning chair and douching tests enabled the determination whether the internal ears and all the intracranial pathways from the internal ears were functioning normally. Recently, in Italy, Colonel Gradenigo stated that he considered it was sufficient to test only for nystagmus and not for pastpointing and falling, because a normal nystagmus alone showed that the internal ears were normal. The reason the other tests were made in America, however, was due to the realization that it was not an end organ alone that was being dealt with, but with a test of a large portion of the central nervous system, most particularly the cerebellum.

#### DISCUSSION

Dr. J. R. Hunt, of New York, expressed himself as being in sympathy with the attempt to group many cerebellar symptoms under the general heading of *asynergia*. This point of view had been adopted by Babinski some years before and had received endorsement from many sources. It seemed to the speaker, however, that if the term *asynergia* was to be used it should be indicated that it was a cerebellar *asynergia*, because the cerebellum was surely not the sole controller of the synergies

of movements. Isolated movements of cortical origin had their special synergies which were not lost in cerebellar disease; automatic and associated movements of striatal origin had their special synergies which were not lost in cerebellar disease, so that the term cerebellar asynergia should be used to distinguish it from other forms of synergic disturbances. It seemed that too little attention had been given to intention tremor as a cerebellar symptom. Babinski recognized and indicated the cerebellar characteristics of intention tremor a number of years ago, and in 1914 the speaker reported a chronic progressive disorder of the nervous system characterized by generalized intention tremors beginning in one extremity, gradually extending, and eventually involving the entire voluntary musculature. The intention tremors of this disorder (*dyssynergia cerebellaris progressiva*) might be divided into definite cerebellar components, such as dysmetria, dyssynergia, hypotonia, and asthenia, the intention tremor being simply the most extreme manifestation of this curious disease, regarded by the speaker as a system disease and referable to some disturbance of the cerebellar mechanism. The organic basis of intention tremor had never been satisfactorily explained; that it was closely related to the cerebellar mechanism would appear probable, as organic disease of the cerebellum might produce a tremor having all the characteristics of tremor of the intention type. Dr. Hunt said he had had for some time under his observation a case of tumor in the right cerebellar hemisphere with a typical hemiintention tremor, associated with dysmetria, hypotonia, and asthenia, and other examples had been reported in the literature, so that the close relation of typical intention tremor to a cerebellar disturbance could scarcely be denied. The chart of cerebellar localization shown by Dr. Weisenburg was suggestive and very interesting, but, as Dr. Weisenburg himself admitted, it was only provisional and was to be regarded merely as a basis for further investigation.

Major Eugene R. Lewis, Medical Corps, U. S. Army, of Washington, D. C., expressed his inability to participate in the neurological discussion, but as an otologist welcomed the suggestion by Dr. Weisenburg of greater intimacy between the two specialties because of the fact that it held forth such great promise of increase of usefulness. He did not consider himself at all capable of discussing the subject of cerebellar localization, but might be able to give some information culled from experiences in the application of the Barany tests in many thousands of normal individuals. As Major Jones had mentioned, asynergia had occasionally been encountered unexpectedly in apparently normal individuals. It was not unusual for a normal individual after being turned to the right, instead of pastpointing to the right, to pastpoint to the left. Inasmuch as one was dealing with young, active, alert individuals it was not surprising to learn that they quickly sensed the fact that they were not pointing in the way they intended to point, that they were past-

pointing against their will, and that they then did the obvious thing of attempting to correct what they had sensed as an error. That correction, the overpointing, was tremendously important to detect and take steps to avoid. In testing the balance mechanism it was important to recognize the necessity of insulating the persons being tested as entirely as possible from all other afferent impulses, for they would orient themselves by any means at hand, by visual, auditory, tactile, deep sensibility or olfactory information. It was therefore important to conduct these tests according to a certain standard technic.

In the test of the duration of nystagmus opinions among observers as to when the nystagmus had stopped varied considerably. In order to get away from this variation the following standard had been adopted: The observer first located some very definite pin point light reflex at or near the inner corneoscleral junction, or in the triangle between the inner corneoscleral junction and the lid openings going down to the inner canthus, prior to the turning. The observer's line of vision in locating such definite pin point light reflex should cross the bridge of the nose from the opposite side. Thus, if the applicant's right eye was selected to be observed, the observer, standing near the applicant's left arm, should look across the applicant's bridge of nose and select a light reflex such as was found at the apex of a small pingueal or any other similar unevenness in the triangular area of conjunctiva between the inner corneoscleral junction and the inner canthus. Having definitely located this light reflex in each individual prior to the turning it was very easy to catch upon it the last definite jerk of a disappearing nystagmus with great accuracy. Dependence upon the observation of striæ in the iris or small vessels of the surface of the eyeball, or corneal reflexes, did not give nearly as accurate results in timing nystagmus. This point was of great importance and it should be an absolute standard of technic.

In taking the spontaneous pointing test before turning a very important element in the test could be injected by implanting in the mind of the applicant the definite idea that he was to attempt to determine the location in space of the observer's finger solely by registering in his memory the location of it according to his tactile sense. This could be augmented by having him touch the observer's finger in more than one position; as, for instance, directly in front of his right hand, come back and touch; then locate again thirty degrees outward and come back and touch; the same procedure in front of the left hand. This implanted in his psychic cortex and subcortex the fundamental idea of being able to orientate himself solely by means of afferent impulses from his tactile endorgans. The insulation of the applicant during this test should be as perfect as possible and he should be left as solely as possible dependent upon the information brought to him along the vestibular tract alone. The applicant should be definitely instructed before turning that

he should not expect a verbal order to touch the observer's finger, raise his hand and come back, and attempt to find it after the turning; he should be practised before turning in executing his touch, raising his hand and coming back to find the finger upon receipt of the signal from the observer's finger as it comes into the position which it maintains during the test, the observer bringing up his finger into position so as to tap the applicant's finger as a signal for him to execute his past-pointing without verbal command. It was very important for the applicant's finger to find a finger of the observer when he came down in search of the finger which was testing him. Otherwise, there was injected into his psychic centers a disconcerting element of dissatisfaction in having failed to find the finger for which he was searching.

Many cases compensated after evincing a normal tendency, say, to pastpoint outward with the right hand when they should do so, and subsequently executed a compensatory touch or inward pointing at the bottom of the return. In such cases the pastpointing should be registered as that executed at the top of the swing, which was the primary and clean response before it had been altered by the subconscious or conscious compensation affected by other mental processes. Visual attention on the part of the observer to the applicant's hand at the beginning of his downward pointing was of enormous importance and it should be very carefully observed as part of the standard technic.

Dr. I. Strauss, of New York, expressed considerable interest in Dr. Weisenburg's presentation of this subject. Not everyone, however, was able to have moving pictures taken of their cases and had to depend on ocular observation. He asked Dr. Weisenburg whether in his post-mortem examination of cases the peduncles had been found to be affected; whether there was disturbed synergia of the right arm and of the trunk found in cases where the lesion was definitely one of the pons affecting the peduncle. The speaker had presented such a case at the last meeting of this society. Of course he could not say that there was in addition no lesion of the cerebellum through extension of the growth up into the lobe. In experimental work which Dr. Isidore Friesner and he were doing at present they had injured the vermis in one animal and its resulting behavior demonstrated asynergia of the head and neck. In another animal where they injured the peduncle there followed involvement of limb and the animal acted as it would if the lobe itself were injured. So he thought there should be a distinction made between the lobe itself and the peduncle.

Another point was this: Even without the aids available at present he thought every neurologist would have diagnosed the lesion in Dr. Weisenburg's case of the child as being in the right half of the hemisphere. They might not have located it in the posterior part, but all would have put it in the lateral lobe. From a practical viewpoint, whether it was the semilunar or quadrangular lobe did not make much difference.

In regard to the work being done in testing for aviation. There was a British aviator here giving lectures who was asked what tests he had undergone for the air service and he replied that he himself had merely been given a reading test for myopia. Suppose one had a case of suppurative labyrinth from which recovery had been made of the symptoms present at the beginning; or possibly a case where the vestibular nerve function was impaired or lost on account of disease. Such a man would know where he was and could maintain his equilibrium on the ground, for it had been found that the cerebrum compensated and had been able to overcome a great deal of the asynergia of the cerebellum. Would such a man be ruled out for that, provided no other symptoms of disease of the cerebellum could be found? Would not a man through muscle and visual senses be able to maintain his equilibrium? Of course, it had been said that all might be well until he got into a cloud or a fog where he could not see, whereupon he would not know if he were flying up or down; but it was doubtful if this were true. In Italy they were satisfied with testing for nystagmus, and everyone knew that their aviation service had set the world an example. Did not that show that the fineness of the tests in this country might not be altogether necessary and if the lecturer from the British aviation service was correct and that up to a few months ago Great Britain did not test for equilibrium, the question came up, how much of this elaboration was necessary in the actual work of aviation?

Dr. Charles E. Atwood, of New York, secretary of the society, asked Dr. Weisenburg if he could throw any light on the diagnosis of double cerebellar lesions, such as those occasionally seen in tubercle of each lobe. He also asked Major Jones if it was known what the Germans were doing in the way of aviation tests.

Dr. I. Abrahamson, of New York, called attention to the necessity for establishing the physiological mechanism of asynergia. Personally he believed that in cerebellar disease the asynergia was due to a fault of tonus. The patient showed disturbance of tonus in extending the hands, in moving the trunk and in other ways. The variety of asynergy that the cerebellar patient showed was that which was mainly due to a fault of tonus and he believed careful study in each case would establish which special variety of asynergia the patient presented.

Dr. Weisenburg agreed that Dr. Hunt's point as to the distinction between cerebral and cerebellar asynergia was well taken, but he could not agree with his views of intention tremor, nor with his paper of some years ago. The speaker had been interested in the study of intention tremor and had made extensive observations by means of moving pictures, but had failed to find it in cerebellar disease. He did not consider tremor of much diagnostic value, nor a symptom of cerebellar disease. He did not agree with Dr. Hunt's view that asthenia and atonia resulted from cerebellar disease. To him all cerebellar symptoms were



the result of asynergy, and whatever else was manifested was a secondary symptom. He did not agree with Dr. Abrahamson that tone was a cerebellar attribute, but considered it a cerebellar phenomenon. Regarding Dr. Strauss's question, that could be answered at once by saying that as yet no diagnosis of peduncular disease had been made by the character of the cerebellar symptoms alone; dependence instead was placed upon the neighboring symptoms. Regarding Dr. Strauss's remark that any neurologist would have been able to make the diagnosis in the case mentioned he agreed with that, but decidedly disagreed with him in the point of view that it did not make any difference to the surgeon or to the neurologist whether a lesion occurred in the semilunar or the quadrangular lobes, just so long as the gross diagnosis was made. He wished to emphasize that this was the point of his whole discussion and that it was the one thing which he had tried to lay particular stress upon in his presentations this evening. It did make a great deal of difference that accurate diagnosis should be made, for it was only thereby that progress could be made in cerebellar localization. It should be the aim of every clinician not only to localize the cerebellar symptoms in his patient but to similarly localize as accurately as possible the location of the lesion in the cerebellum.

Major Jones replied first to Dr. Atwood's question regarding the German tests: Considerable information regarding the tests used by the Germans was at hand, the salient feature of which was that they had used the ear tests in aviation for many years. In reply to Dr. Strauss, an interesting case would serve to illustrate. It had been observed by many fliers that one instructor flew in a peculiar way; he would allow either one wing or the other to be tilted sidewise to a dangerous degree without making any effort to correct it. This was true when he was at a high altitude and also at a low altitude; but on nearing the ground, when he could orient himself by the sense of sight, he would straighten out and land satisfactorily. On one occasion he was flying over Philadelphia and entered a cloud; his passenger was an experienced aviator who became alarmed at the manner in which the plane was being guided. This passenger could detect deviations in position which apparently meant nothing to the pilot and which resulted in a dangerous sideslip. Examination in the turning chair on the following day showed that the pilot had practically no responses in nystagmus, vertigo, pastpointing, and falling (probably due to mumps in childhood), whereas the passenger showed entirely normal responses.

## Critical Digest and Review

### WAR NEUROSES AND PSYCHONEUROSES

BY DRS. CHARLES ROCKWELL PAYNE AND SMITH ELY JELLIFFE

(Continued from page 148)

For a systematic and detailed description of the physical symptoms of the war neuroses, we turn to the French clinicians. The following résumé is abstracted from "The Psychoneuroses of War," by J. Roussy and J. Lhermitte, published in English translation by D. Appleton & Co., in Vol. II of their Medical and Surgical Therapy, 1918.

Psychoneurotic *motor symptoms*, paralyzes or contractures, are among the most common and therefore most important physical symptoms of war neuroses. These motor disorders take the form of a flaccid paralysis or paralysis with contracture, when they more or less closely resemble the true organic paralyzes, either flaccid or spasmodic; thus we find hemiplegias, paraplegias and monoplegias. Sometimes they defy classification and may assume the most infinite variations in type. In spite of their diversity, the psychoneuropathic motor complaints have certain common characteristics: they appear under the same etiological conditions, they exhibit specific clinical and "pathognomic" signs which permit of their differentiation from organic diseases and, lastly, they react to therapeutic measures in a similar manner.

Sometimes these conditions originate from some fairly severe trauma not entailing any grave wound, a cerebrospinal concussion from the explosion of a projectile or a mine close at hand but without any obvious bodily wound, shock from the collapse of a trench, etc. In other cases the paralysis develops without any mental or physical shock. It is not exceptional to find that these paralyzes or contractures are preceded by more or less vague pains in the joints of the limbs which have been contused. Or these motor affections may develop in hospital during the course of an infectious disease contracted in the trenches.

The situation of the trauma has no bearing on the site of de-

velopment of the paralysis. A scar, proving the existence of a real initial trauma, may even be found at a great distance from the affected limb. Further, the severity of the wound bears no relation whatever to that of the paralysis; on the contrary, it appears that in most cases it is the most insignificant wound that brings about the most serious functional paralysis.

The onset of these motor affections is much the same, whatever form they may take. Sometimes they appear immediately after the trauma, as soon as the patient recovers from the emotional shock that he has just experienced; or if he has lost consciousness, at the moment he regains it in the field-ambulance or hospital. Often the hemiplegia, monoplegia or paraplegia may not become manifest until several days later, and during this period—the phase de méditation of Charcot—the soldier only exhibits vague symptoms in keeping with a physical and psychical disorder occasioned by the trauma: more or less diffuse aches and pains, vertigo and general asthenia.

*Hysterical Hemiplegia.*—Although much rarer than paraplegia or the monoplegias of the same nature, hysterical hemiplegia is far from a rarity. With regard to the upper extremity, it is very often more affected than the lower; hanging beside the body, it is incapable of any voluntary movement. Neither the face nor the tongue share in the paralysis, and the apparent facial paralysis sometimes met with is really due to a tonic glosso-labial spasm of the opposite side. The cutaneous and tendon reflexes are normal and muscular tone is equal on the two sides. This rule, however, has certain exceptions which it would be dangerous to ignore. Following on prolonged functional inactivity, the muscles of the paralyzed limb undergo atrophy, and this itself necessitates an inequality of the tendon and bone reflexes; the latter will be more marked on the side of the hemiplegia, without always being accompanied by true ankle clonus or patellar clonus.

*Hysterical hemiplegia with contracture* develops suddenly and is of two forms: (1) One characterized by an intense contracture of the upper and lower limb to such a degree that all passive movement is impossible. (2) The other, in which the hemiplegia assumes both a spastic and flaccid type; spastic as regards the contracted lower extremity, flaccid as regards the upper, which hangs absolutely inert beside the body. Vasomotor symptoms such as lowering of temperature, cyanosis of the paralyzed extremities, profuse sweating, edema, etc., are the result of functional inactivity.

*Hysterical Monoplegia and Paraplegia* are more frequent than

psychoneurotic manifestations of the hemiplegic type. Of the monoplegias, in the upper extremity, the flaccid type is the more common; in the lower extremity the reverse is true, there being more cases of the spastic type. Paraplegia is the most common of all these motor disturbances.

In addition to the groups just enumerated, motor affections of spastic or paralytic type, limited to a circumscribed region such as the foot, hand, shoulder, trunk, neck, or a group of muscles, are frequently observed in the neuropathology of war.

*Disturbances of Gait.*—These are many and diverse in form. We shall pause only to name them: Astasia-abasia, dysbasia of choreiform type, dysbasia of pseudo-tabetic type, dysbasia of pseudo-polyneuritic type, various atypical forms such as tight-rope walker's gait, knock-kneed gait, walking as if on a sticky surface, bather's gait, scrubber's gait and finally a class in which fear is the predominating factor called staso-basophobia.

*Tremors, Tics and Choreiform Movements.*—This group of symptom is of frequent occurrence among patients suffering from the war neuroses. Considering first the tremors we may divide these into atypical and typical tremors. The atypical tremors are irregular disorderly movements not resembling in their behavior or course any tremors accompanying known maladies. The typical tremors are those which more or less resemble those seen in nervous diseases which are accompanied by tremor.

The atypical tremors are sometimes generalized, affecting all the body muscles and sometimes localized, affecting only a limb or part of a limb. When generalized, they are usually associated with other symptoms as a part of the clinical picture of the "shell-shock syndrome." The facial expression seems to portray indescribable terror, and shares in the disorderly and irregular movements of the whole body. The tremor has been justly considered (Ballet) as the expression mimicking fear. There are also circulatory disturbances (tachycardia, flushing or pallor of the face), secretory changes (perspiratory, lachrymal, small salivary secretion, discharge of urine), all of which with the tremor are manifestations of the emotion. In these generalized tremors the patient is shaken by vibratory oscillations of variable intensity, sometimes fine and limited to the extremities, more often wide and irregular; in the latter there are extreme oscillations of the limbs reminiscent of chorea gravis, accompanied by clonic movements of the muscles of the face and neck. The patient cannot stand upright nor walk and has to be carried on a stretcher. On the slightest touch or examination these illogical

and paradoxical movements become more violent and sometimes reach a surprising intensity. Any sudden noise, such as the slamming of a door, or particularly the sound of cannon, may determine the occurrence of paroxysmal crises.

The *typical tremors* resemble, either by the actual character of the tremor or by associated signs, the definite tremorous disorders which are well known and classified in neuropathology. Various types are the pseudo-Parkinsonian type, the disseminated sclerosis type, the pseudo-cerebellar type and pseudo-choreiform types.

*The Tics.*—Tonic tic may be observed as a result of wounds or nervous shock in war, but is much less common than the clonic tic or spasmodic movements which make their appearance under their appearance under the same conditions as the tremors. They are usually observed in and around the head.

*Psychical Disturbances of Sensation.*—These occupy an important place amongst the psychoneurotic manifestations of war and may be divided into two main groups: (1) Psychopathic pains or "algias" and (2) anesthetics.

The algias are very common. They may be grouped according to anatomical location as algias of the lower limbs, of the upper limbs, of the trunk and spine, of the neck and head, and visceral algias; the latter may be gastric, visceral, renal, etc. The most frequent are those of the lower limbs. Differential diagnosis of these pains may be a matter of considerable difficulty. The following points should be considered. (1) Distribution of the pain; it is usually paradoxical in its nature and erratic in its localization. (2) Associated signs noted during examination: (a) respiratory manifestations (the dyspnea of exertion or emotional dyspnea) and the resistance shown by the patient to attempts at examination or passive movement. (b) The psychological condition of the patient who is often uncommunicative, unwilling to look the examiner in the face, always ready to turn the conversation, etc. (c) The occurrence of fresh nervous phenomena as tremor, convulsive crisis, outburst of weeping, sweating etc. (3) The absence of somatic signs is of course of great value. (4) Therapeutic tests and their results.

*Anesthesia, Analgesia and Hyperesthesia.*—Modifications of objective sensation are much less important than those of subjective sensation just discussed. Not being perceived by the patient they produce no loss of function. They are never a predominant or isolated sign, but are part of a symptomatic picture of functional order, during the course of which they may be discovered if they are looked for. Bobinski's method of testing sensation is worthy of note: The patient with closed or bandaged eyes, should not be asked

to say whether he feels distinctly or less distinctly a touch, prick, or warmth at some point of the body under examination; he should not be asked to say "yes" or make some sign at each touch or prick, as this will lead to his attention being drawn to the examination. He should be told to point at once with his finger to the site of the prick or touch.

Although these so-called hysterical anesthetics may present some points of interest in the neurology of the war as signaling a psychopathic condition, their diagnostic value has been grossly exaggerated. If the physician would refrain from a systematic examination of these sensory disorders, of secondary or negligible importance, or if he adopted a more rational method of conducting the tests, the frequency of these hysterical anesthetics would be, to say the least, very sensibly diminished.

*Psychical Disorders of the Special Senses.*—Disorders of hearing are most common, of vision next, and those of smell and taste rare. Deaf-mutism, the most frequent type, is seen in three different forms: (1) with delirious mental confusion; (2) with dull mental confusion; (3) those clearly conscious who call attention to their trouble by gestures. Deafness may occur alone but is less frequent than when associated with mutism. Mutism may also exist alone, without deafness. In some cases the nervous shock is succeeded, not by mutism but by simple *aphonia*. This sometimes exists from the first but more often follows mutism when the latter is on the way to recovery. *Stuttering* may exist alone or associated with other symptoms of shock; it occurs under similar conditions as these other disorders and is accordingly included here.

With regard to the nature of these disorders, it is quite evident that we have to deal with a psychoneurosis of emotional or concussion origin, resulting from emotional shock. They are quite on a parallel with the tremors or impotence of the limbs, the loss or disorder of speech being one of the modes of reflex outward manifestation of the emotion. As for auditory affections, it is easy to understand that the intense bombardments and the violence of modern explosives may cause auditory disorders, deafness, etc., a matter of common knowledge to all who have been under heavy fire; such factors are well calculated to produce neuropathic manifestations in predisposed individuals with an already unstable nervous system. *Disorders of vision:* These are much less frequent than those of hearing. Complete amaurosis is infrequent. Amblyopia and photophobia are common. Blepharospasm, movements of the lids or blinking are also common symptoms.

(To be continued)



## Current Literature

### I. VEGETATIVE NEUROLOGY

#### 1. VEGETATIVE NERVOUS SYSTEM.

**McCollum, E. V.** THE VITAMIN HYPOTHESIS. [J. A. M. A., Sept. 21, 1918.]

The author calls attention to the fact that a "complete" protein yielding all the amino-acids that are required in the nutrition of an animal must contain, in the form of suitable salts, nine of the inorganic elements, namely, calcium, magnesium, sodium, potassium, iron, chlorine, iodine and sulphur. The diet must supply a suitable quota of energy in the form of protein, carbohydrates and fats, and must, in addition, contain certain substances of unknown chemical nature, to which the name of "vitamins" was given by Funk. For each of the syndromes now usually spoken of as deficiency diseases, which can be conclusively demonstrated to be relieved by the administration of preparations containing these unknown substances, the existence of "vitamins" is demonstrated. Successful attempts in this direction, the author says, have been limited to two syndromes, namely, beri-beri, and more recently, a type of xerophthalmia resulting from specific starvation for a substance that is especially abundant in the fats of milk and of egg yolk, but is found in all foods containing cellular structures, whether of animal or vegetable origin. McCollum and Simmonds have shown that this syndrome is analogous to polyneuritis in that there is an organic substance widely distributed in natural foodstuffs which causes a prompt relief of all the symptoms in animals suffering from starvation of this particular substance. Efforts to demonstrate the existence of a specific substance that can relieve scurvy, a disease from faulty diet, have so far proved unsuccessful, and although pellagra has been suspected by some as being one of the deficiency diseases like beri-beri, no convincing evidence has proved it. The literature of the research in this direction is briefly reviewed. McCollum and Davis made a systematic effort to find out why animals do not thrive on diets otherwise appropriate but lacking this chemically unknown substance. Their efforts led them to the belief that in addition to the proteins, carbohydrates, fats and inorganic salts, the diet, to maintain health, must contain two chemically unidentified substances which have been designated by McCollum and his co-workers as fat-soluble A and water-soluble B. The first of these is found abundantly in certain fats like those of egg yolk and milk; the second is never

associated with any fats, animal or vegetable. When fat-soluble A is lacking the above mentioned xerophthalmia is produced. Water-soluble B is the "curative" substance for polyneuritis. According to McCollum, these two syndromes are the only two deficiency diseases in the sense in which Funk employed the term. Scurvy and pellagra, while due to faulty diet, can be explained in other ways than by the lack of a specific complex in the diet. The subject of scurvy as it appears when produced experimentally in animals is discussed rather extensively with a number of references to the literature. Recovery from this disease, following a change of diet, McCollum concludes, can be better explained than by the introduction of a hypothetic antiscorbutic substance. Hess' observation that one of the most common symptoms of scurvy is oliguria is quoted as important as explaining the therapeutic effects of citric acid. It is not necessary, the author thinks, to assume the invasion of the body by organisms as a factor in the causation of scurvy, although this may take place. The adsorption of abnormal decomposition products of proteins may be chiefly responsible for the pathologic changes. Goldberger and his associates have solved one of the greatest public health problems in proving that there are certain types of food mixtures, such as combinations in which seeds, tubers, edible roots and meats are either singly or collectively combined with suitable amounts of the leafy portion of the plant, and combinations of seeds, tubers, roots, meats and leaves, singly or collectively, with liberal amounts of milk, that can relieve the symptoms of pellagra. The faults in such diets as are derived largely from seed products, tubers, molasses and fat meats are generally those of all seed diets, but where the endosperm of the seeds predominates, as in bolted flour or rice and degerminated corn meal, the deficiencies are much more pronounced. The infection theory of pellagra cannot be at present dismissed, but if it is the result of infection the latter is superimposed on a certain degree of debility that results from defective diet. McCollum considers it practically demonstrated that it cannot be due to absence of any unidentified dietary essential, but rather to the lack of storage or protective foods, as he calls them, that are found in the leafy portion of the food.

**Serge Voronoff and Evelyn Bostwick.** ORGANOTHERAPY IN WOUNDS.  
[Presse médicale, Sept. 9, 1918.]

These authors report that, after much experimentation at the Collège de France, they were able to cause healing of extensive and deep wounds in a few days, by applying locally the pulp of sex glands procured by castrating young animals. The cells of these glands, through the secretion they contain and which is absorbed by the wound, exert an intense accelerating action on the process of granulation. The organ found most effectual in these experiments would, *a priori*, have been considered that most suitable, owing to its especial vital energy. Animals deprived

of these organs are known to accumulate fat at the expense of their muscles and to become apathetic and passive. In the wounds treated with this material, its use often had to be discontinued after a few days in order not to exceed the results sought and cause projection of new tissue beyond the level of the wound cavity by reason of a too intense development of granulations. With the aid of this treatment its sponsors hope to spare the wounded long months of suffering and considerably shorten their stay in hospitals. This method is being tried at Carrel's hospital.

**Roth, H.** PAROXYSMAL TACHYCARDIA. [Corresp. f. Schw. Aerzte, August 17, 1918.]

This author says that this differentiation appears to be easy, but there are many different conditions which give rise to the same symptoms. There can be no rational therapeutics in its absence. The heart with this behavior may be healthy or diseased. Paroxysmal tachycardia is closely allied to extrasystoles; the mechanisms of both phenomena are related. The structures of the heart involved in both are the sinus, auricle, atrioventricular nodes and certain portions of the ventricle. The author goes so far as to state that the two phenomena are virtually one not only in mechanism but in etiology. It is known that in arrhythmia perpetua the phenomenon in question cannot be elicited. Disturbances of conduction stand in some relationship to paroxysmal tachycardia. Total atrioventricular dissociation prevents the development of ventricular tachycardia outright. The nervous factors are vagus paralysis, accelerator stimulation, or both combined. The essential factor, however, is pathological irritability of the cardiac muscle fibers. The importance of the nerve mechanism in these attacks is shown by the presence of psychogenic forms. The author cites cases: A soldier of twenty-two years had palpitation. A year before he had had follicular tonsillitis. During a paroxysm he had no dyspnea nor were there any evidences of dilatation. There was marked venous pulsation in the neck. The pulse was 225. Compression of the eyeball brought about a notable reduction in frequency, which held until the attack passed off. The patient ultimately recovered from these crises. From an analysis of polygrams under various conditions, including the use of atropine and adrenaline, it seemed that the tachycardia originated in the sinus. Of four other cases given in detail all were also examples of sinus tachycardia, which is therefore not uncommon.

**Claude, Henri.** NERVOUS FORM OF ENDOCARDITIS LENTA. [Bulletin de l'Académie de médecine, March 12, 1918.]

The author reports the case of a young man of eighteen suffering from marked anemia, lassitude, and a temperature ranging between 38° and 39° C., with a slight systolic murmur at the apex. Six months before he had developed severe chorea, which had lasted over two

months, then gradually lessened, while leaving him in a weakened general condition. Two weeks after admission in the hospital, he had pain in the left hypochondrium, the spleen became palpable, and a rise in temperature to  $39.8^{\circ}$  took place, with rigidity of the neck and spinal column. Next day the meningeal signs grew more marked and an attack of rightsided hemiplegia occurred, with increasing alternate paralysis of the facial nerve on the right and the trigeminal on the left. The patient remained semicomatose for about three weeks, then seemed distinctly better for a few days. At this time repeated lumbar punctures showed increase of albumin in the spinal fluid, with polynucleosis and later lymphocytosis. High fever set in, soon terminating in complete cachexia and death. Postmortem, the mitral valve and left auricular wall showed abundant vegetations containing grampositive streptococci. The nerve centers showed a slight meningocortical reaction, and in particular a small focus of softening in the left pontocrural region, adjoining an arteritis of the basilar trunk. Sections of this and other arteries revealed local ectasias of the arterial walls due to infectious arteritis. Multiple infarcts in the spleen were also found. The chorea and meningeal symptoms in this case are alike ascribed to the special streptococcic infection which had given rise to the heart lesions. Along with the frequent embolic complications of endocarditis lenta, a definite rôle in the production of complications should be recognized for infectious arteritis with local ectasias, as illustrated in the present case.

**Gruber, C. M., and Markel, Casper.** TONUS WAVES FROM THE SINO-AURICULAR MUSCLE PREPARATION OF THE TERRAPIN AS AFFECTED BY ADRENALIN. [*Journal of Pharmacology and Experimental Therapeutics*, August, 1918.]

These authors state that adrenalin caused a disappearance or a diminution in the tonus waves observed in the sinoauricular muscle preparation of all the terrapins used, and there was a simultaneous increase in the force and amplitude of the contraction, and in some instances an increase in the rate of contraction. When the solution was strong, the waves ceased almost immediately; when a more dilute solution was used, only a few tonus waves appeared after the addition of the adrenalin to the Ringer's solution. The length of time required after an injection of adrenalin, before the recurrence of the waves, varied directly with the strength of the adrenalin solution used. Oxygen added to Ringer's fluid seemed to hasten the process of recovery, which might be only a matter of hastening the oxidation of the adrenalin.

**Robey, W. H., and Boas, E. P.** NEUROCIRCULATORY ASTHENIA. [*J. A. M. A.*, Aug. 17, 1918.]

These authors discuss the condition which was known as "soldier's heart" during the Civil War in which the syndrome of symptoms is "breathlessness on exertion, tachycardia, palpitation, precordial pain,

vertigo, headache, easy fatigue, lassitude, high systolic blood pressure and general nervous instability. All of these symptoms are exaggerated by a slight amount of exercise. Not all patients have a complete syndrome, but the chief complaint is precordial pain. Thrills are common, and their presence led us at the outset to think, in some cases, that we were dealing with mitral stenosis, but the thrill is generally systolic in time, and the other phenomena of stenosis are absent." Such cases are of importance because of their frequency, especially in the army, where until very recently there has been no category of light duty suitable for them, and therefore, more soldiers have been discharged than would have been really necessary. The treatment based on the experience of thirty-nine cases out of a total of 200 at the base hospital Camp McClellan, Ala., treated by the authors is described. Twelve per cent. of them were returned to full duty but one could not stand the work and was discharged. Four patients out of the eighty-nine were returned to light duty. The treatment used was that recommended by Lewis, that is, graduated exercises, and the point they have to emphasize is that the exercises brought about no improvements in patients whose condition was constitutional. They have become convinced that neurocirculatory asthenia is due to an incurable fundamental nervous instability. The vast majority of the patients give a family history of nervous disorder, and the cardiovascular and nervous symptoms go hand in hand. Neurocirculatory asthenia as seen in the training camps occurs in fundamentally unstable nervous individuals with resultant instability of the vasomotor system. The patients that were returned to duty had the same symptoms at the end of treatment as at its beginning. The blood pressure studies of these cases is of interest. When the patient is up and about the systolic pressure is high and the diastolic generally normal. After exercise the systolic pressure rises greatly and not infrequently the diastolic pressure drops. A frequent feature is the persistence and loudness of the fourth sound heard with the stethoscope when taking the blood pressure. In all cases the pulse rate has been accelerated after exercise and emotion has the same effect. There are some sensory precordial symptoms. In their conclusions the authors call attention to the importance of the early recognition of neurocirculatory asthenia by recruiting officers and regimental surgeons. Some cases become evident immediately. Others only after a few weeks of intensive training. Lately they have used the exercises more for diagnostic purposes than as a method of treatment.

Duran, B. L. ARTERIOSCLEROSIS AND VASCULAR CRISES. [Prog. d. 1. Clinica, July, 1918.]

Vascular crises, as Jelliffe and White have pointed out, may occur in the brain, the chest, the abdomen or in the legs. This Duran confirms and discusses. Intermittent claudication occurs chiefly in the muscles of the legs. The chest group make up angina pectoris and acute edema

of the lung. Abdominal crises occur after emotional stress. The cerebral group show attacks of sudden unconsciousness without convulsions. Pallor is followed by vasodilation and sweating. These attacks recurred every three or four weeks in the patient described. They gradually became more intense with slight residuals in speech and twisting of the head. They first developed at 50. In other cases these vascular crises were accompanied with transient monoparesis or hemiparesis, amnesia and aphasia. Treatment should aim to ward off excitement and stimulants for the circulation, while reducing autointoxication to render the nervous system less irritable and reduce the blood pressure. Tobacco and coffee seem most injurious of all stimulants in these cases. With acute pulmonary edema, Duran always found venesection useful, supplemented by tonics for the heart hampered by the pressure. In the cerebral type stimulation of the peripheral circulation is the main thing. Carbonated baths are useful in the incipient cases of arteriosclerosis. Although Duran calls attention to the emotional etiology as of paramount importance he neglects it or assumes a purely simplistic attitude towards it in therapy. These are cases preëminently to be studied psychoanalytically.

**Binet, A.** ACTION OF ADRENALIN ON THE GASTROINTESTINAL TUBE.  
[Presse médicale, August 5, 1918.]

The experimental basis for the observations of this author include: Removal of the adrenals which produces certain alterations in the gastroenteric tract; adrenalin is known to modify the blood supply, secretion, and motility of this tract. Extirpation of the adrenals cause gastric ulcer to develop, especially after bilateral extirpation. Ten hours after operation, marked hypotension having appeared, ulcers form with great rapidity. These lesions appear at the more usually observed localities—pylorus, prepylorus, and duodenum. They are round or oval, and measure about 2 cm. in diameter. They stand in a certain relationship to gastric acidity, because sodium carbonate may prevent their development. Authors have attempted, of late years, to isolate a type of adrenal dyspepsia and a gastroenteric form of adrenal insufficiency. Such conditions must stand in some relationship with the functions controlled by adrenalin—vascularity, secretion, and motility. Adrenalin, when injected hypodermically, causes vasoconstriction in the alimentary canal, and may be made of value in intestinal hemorrhage. Despite its vasoconstrictor action the drug is known to stimulate the action of the gastric juice, or rather to increase the secretion of free hydrochloric acid. In regard to motility, the drug appears to activate some portions of the gut and to exert the opposite action on other portions. Thus it appears to cause contraction of the esophagus and to relax the intestine, or portions of it. All of the contradictory finds can be explained by the size of the dose, which produces a given effect.



Naturally, this peculiarity renders the subject of dosage, especially by the mouth, a difficult one. If the drug is thrown into the rectum it maintains its toxicity unchanged, but when swallowed it ceases to be toxic. The reason is far from clear, for none of the digestive enzymes interferes in any way with its action. When taken by the mouth it seems to be detoxicated and rectal absorption seems unavoidable.

## 2. ENDOCRINOPATHIES.

**Kosmak, G. W.** PITUITARY EXTRACT. [J. A. M. A., Oct. 5, 1918.]

Dr. Kosmak says that the hypophysis extract has now been the subject of clinical observation long enough to warrant a determination of its value. Its possible variability as sent out by the different manufacturers, the exaggerated claim of some of its users and the cautions expressed by some make such a determination desirable. More recent observers have abandoned the claim of its absolute harmlessness and restricted its field of application. A "physiologically standardized preparation," labeled as such by manufacturers, is a distinction of little account as its potency may vary with the animal from which it is derived. The thyroid of animals is known to be subject to variations, and this probably applies to other endocrine glands. The blood pressure method and observations on the isolated guinea-pig uterus have been largely employed, and the official standard for the United States Pharmacopeia is by comparison with the effects of histamin, a substance isolated from ergot and due to the bacterial decomposition of histidin. Impartial investigators, Kosmak says, do not regard these methods as entirely reliable. The indications for use of pituitary extract may be regarded as fairly established, and its conservative use should be limited to conditions of simple uterine inertia, without any mechanical obstruction, and with the patient not exhausted. Its employment to stimulate labor pains with or without other means is being lessened, and its use in such malpositions as occiput posterior and face presentation is likewise regarded in a doubtful light. The bad effects vary from cervical and perineal laceration to complete rupture of the uterus. Postpartum hemorrhage must also be guarded against, and the possible asphyxiating effect on the child must be considered. Several years of use and observation of the drug have led the author to believe that it is his duty to caution practitioners to avoid using it for shortening of labor. He reports a case of asphyxia of an infant when it was given in a case of cesarean section before the incision of the uterus, and he has seen it used unsatisfactorily in other cases. We can safely dismiss, Kosmak says, the contention that pituitary extract renders the forceps unnecessary. He is less pessimistic as to the value of the drug than he is as to the possibility of getting practitioners to use it properly. He does not find it of value in other than obstetric cases, but he has had good results in cases of hemorrhage when it has given excellent temporary aid

until other methods could be utilized. His conclusions are as follows: "I may summarize my estimate of pituitary extract by describing it as a valuable addition to our therapeutic resources, but one which must be used with great caution, particularly in obstetric cases. Here it is safe only in cases of simple uterine inertia, particularly in multiparas, when there is no obstruction to the passage of the child, no exhaustion, and the presenting part engaged. It should be used in doses of not over 5 minims at a time, repeated only when the effect of the previous dose has worn off. For the induction of labor, or as an accepted substitute for the forceps, it would be best not to consider pituitary extract. Properly used under proper indications, the extract of the hypophysis has a distinct place and value. Indiscriminate and improper use will only tend to relegate a good therapeutic medium to the discard."

**Bazin, A.** SUDDEN DEATH FROM ADRENAL SCLEROSIS. [*Journal de médecine et de chirurgie pratiques*, Oct. 10, 1918.]

The patient was an alcoholic artilleryman, aged 38, with poor general condition but an excellent soldier. He complained of fatigue, backache, and diarrhea. His fatigue increased on lying down. Although under observation several days no diagnosis seems to have been made. The symptoms became aggravated without new developments. Then a cadaveric odor appeared which seemed to emanate from the entire surface. Sergeant's white line could not be elicited. The first diagnosis was asthenia attributed to influenza. The latter had not been mentioned before in the history and was presumably masked or mild. After a day of effort he became worse. He had complained off and on of dyspnea and his pulse had been weak and rapid. Death took place suddenly in syncope. The autopsy showed no tuberculosis, no cardiac lesion and general freedom from organic disease save sclerosis of the pancreas and adrenals. The liver and kidneys showed some enlargement but no histological report was made. Even the pancreas is not accused of contributing to death. Sergeant himself made the histological study of the adrenals and appears to regard the sclerosis of these organs as the sole cause of the invalidism and sudden death. The nature of the process is not clear beyond the belief that the attack of grippe, mild as it was, was sufficient to determine the acute symptoms. The glands appeared to have suffered no marked functional compromise and were equal to their work under normal conditions. The blood pressure was not taken but there was absence of pigmentation and of the white line while the gastro-enteric symptoms were not of high degree.

**Kuriyama, Shigenobu.** THE ADRENALS IN RELATION OF CARBOHYDRATE METABOLISM. I. [*The Journal of Biological Chemistry*, May, 1918.]

In this first article the author considers the influence of repeated injections of epinephrine in rabbits on the intensity of glycosuria and

hyperglycemia and the glycogen content of the liver. He found that the character of the curve of sugar excretion was not particularly altered so long as the rabbits were well nourished after daily repetitions of subcutaneous injection of epinephrine. When fasting, the intensity of glycosuria decreased markedly, though the epinephrine dose increased relatively in proportion to loss of body weight, until a stage was reached at which it remained fairly stationary. There was no marked modification in epinephrine hyperglycemia in well-nourished animals after daily injection of epinephrine. In some cases among the fasting animals the intensity of hyperglycemia fell a little, though it was usually as high as in the feeding period. The marked diminution of epinephrine glycosuria in fasting cannot be explained by insufficient hyperglycemia or by the so-called epinephrine habit, but the fasting itself must in some unexplained way be the predominant factor. The glycogen content of the livers of the fasted rabbits subjected to epinephrine injection was greater than that of the controls, but the content of the muscles was about the same in each. As a single injection of epinephrine in fasted rabbits caused an increase in the glycogen content of the liver, the abnormal glycogen storage in that organ cannot be laid to continued epinephrine administration. Kuriyama suggests the possibility of unduly catabolized protein facilitating a storage of glycogen. [J.]

**Kuriyama, Shigenobu.** THE ADRENALS IN RELATION TO CARBOHYDRATE METABOLISM. II. [The Journal of Biological Chemistry, May, 1918.]

In a second study the author repeated the work of Schwartz to determine whether the adrenal or epinephrine has a specific effect on the glycogenesis of the liver. Using medium-sized albino rabbits adrenalectomy was performed at two different times, varying from 2 to 7 weeks apart; after the second time they were fed on various foods. Of these, sucrose was the most effective in storing liver glycogen, though this was also accomplished by mono-, di-, and polysaccharides and protein. In these experiments no positive evidence was adduced to show that adrenalectomy had any specific influence on the glycogenetic power of the liver, and the emaciation of the animals seemed to account sufficiently for some difficulty in storing liver glycogen. Determinations of the blood sugar ranged from 0.12 to 0.08 per cent. in the adrenalectomized animals. This was slightly lower than in the control animals, but still within normal limits. [J.]

**Kuriyama, Shigenobu.** THE ADRENALS IN RELATION TO CARBOHYDRATE METABOLISM. III. THE EPINEPHRINE CONTENT OF THE ADRENALS IN VARIOUS EXPERIMENTAL CONDITIONS. [The Journal of Biological Chemistry, May, 1918.]

In his first problem the author determined the effect of post-mortem change on the epinephrine content of the adrenals. When they were

removed without damaging their form and kept in air at room temperature, it was markedly decreased in a few days, but when the glands were kept in oxygen-free medium, such a decrease was not observed. He next showed that continued subcutaneous injections of epinephrine did not materially change either the weight of the adrenals or their epinephrine content, nor was it changed by acute epinephrine intoxication, nor by prolonged fasting. In diphtheria intoxication the epinephrine content of the adrenals was markedly decreased, but hyperglycemia was not observed. The final study in this series was to determine the change of weight and epinephrine content of one adrenal after the removal of the companion gland. Though the weight of the adrenals showed a widely ranging individual variation, the removal of one adrenal caused a marked increase in the weight of the other, especially in the females, quite disproportionate to the increase in body weight. There was also an increase in the absolute epinephrine content of one gland after the removal of the other, though the epinephrine content of the adrenal, calculated per gm. of the gland, was decreased. Kuriyama believes that the marked increase in the weight of one gland after removal of the other is probably mostly due to the increase in the size of the cortex, rather than in the medulla. [J.]

**Deluca, F. A.** SUPRARENAIS IN MALARIA. [Sem. Med. Buenos Aires, Jan. 24, 1918.]

The author has observed three patients with a suprarenal syndrome developing in the course of malaria, with necropsy in one. A tropical type of acute suprarenal disturbance due to malaria must therefore be looked for. In the severer cases, intravenous injections of artificial serum with epinephrine may tide the patient past the danger point. Quinine therapy should not be overlooked.

**Betchov et Demole.** TWO CASES OF ADRENAL INSUFFICIENCY: [Rev. méd. de la Suisse rom., June, 1918.]

The author describes two patients with acute adrenalin insufficiency. the first a male, aged 44, had recently had quinsy, after which he suffered from what seemed to be lumbago. The next symptoms were those of probable malignant disease of the left side of the neck—a primary lesion and enlarged regional lymphnodes. He began to emaciate, which reinforced the diagnosis of malignancy. It was thought that the tumor in the neck was a secondary nodule, but no primary growth could be detected. The remainder of the finds of a systematic examination were also negative with the exception of vascular hypotension. Sergeant's white line was repeatedly obtained. Poultices applied to the loins brought out a brown pigmentation. An injection of adrenaline increased the blood pressure without causing glycosuria. The lumbalgia had persisted. The patient developed a slight bronchitis, but he rapidly sank and

died of adynamia. Autopsy revealed a complication, the primary growth being an ulcer of the base of the tongue with numerous metastases, including the visible ones of the neck. The right adrenal was the seat of a cancerous metastases, while its fellow appeared to be hypertrophied. The second patient was a man of 24 years, who went through a typhoid fever complicated with perforation and peritonitis. Owing to the profound state of depression, a surgical operation was out of the question. The presence of the white line and low bloodpressure showed the condition of the adrenal functions. Death was preceded by the development of acute hemorrhagic diathesis. There was a marked anatomical foundation for the adrenal insufficiency, but the lesions could not be interpreted beyond evidences of degeneration of some sort. Such lesions have frequently been encountered in death from acute infectious diseases, but the rationale is not apparent, although the adrenals have evidently lost most of their lipid content.

**Ohno, S.** ADRENALIN CONTENT OF SUPRARENALS AFTER DEATH FROM BERI-BERI. [Mitteil. d. med. Gesellsch. z. Tokio, March 5, 1917.]

On the basis of the post-mortem examination of ten acute beri-beri cases, and of two which occurred during pregnancy, the author finds a medullary hypertrophy of the suprarenal and an increased adrenalin content. The chemical examination was made by the Comessatti method and the average for the left gland was 14.96 mg. It is as yet unknown what relation exists between the clinical manifestations of beri-beri, especially of the acute type, and this adrenalin-hyperfunction.

**Baudron, S.** SERGEANT'S WHITE LINE IN SOLDIERS. [Journal de médecine et de chirurgie pratiques, July 25, 1918.]

The author carried on an investigation for Sergeant's white line in 100 soldiers in a garrison infirmary. The technique was carried out in the usual manner, the skin of the abdomen being stroked gently with the pulp of the finger; a slight pressure is necessary. At the expiration of a few minutes one sees the appearance in the track of the finger of a white streak, which increases in distinctness until a maximum is reached, remains stationary for a longer or shorter time, and then slowly effaces itself. The interpretation of this line has led to controversy, and it was to throw more light on the subject that the research was carried out. Military exigencies are also much more favorable for the occurrence of conditions which favor the development of the line than civil life, for there we find constantly states of infection or intoxication in combination with overwork and fatigue. In the hundred subjects examined the line was elicited in 81. It was present in all but two of the following febrile cases and in 17 out of 20 subjects with gonorrhea. It was never absent in grip, rheumatism, malaria, or tuberculosis, and was encountered in a variety of purely local conditions, as gingivitis and orchitis. The

conclusions of the author concerning the white line are as follows: It is of great value in certain emergencies of differential diagnosis, as when acute adrenal insufficiency is confused with a pyrexia of meningeal, thoracic, or abdominal origin. Its association with certain infections like grip and rheumatism means a certain degree of asthenia and hypotension, and betrays the implication of the adrenals in the disease picture. Here it does not indicate a serious state of affairs in comparison with the severe syndromes of acute adrenal insufficiency, with collapse, and does not carry a bad prognosis. Finally, when encountered in association with some trivial local condition, it represents a mere coincidence, or is due to a transitory disturbance of vasomotor equilibrium.

**Cramer, W.** THYROID ADRENAL APPARATUS. 1. DEMONSTRATION OF ADRENALIN GRANULES IN THE SUPRARENAL GLAND; 2. FUNCTIONAL ACTIVITY OF THE SUPRARENAL MEDULLA IN PATHOLOGICAL CONDITIONS. [Jour. of Physiology, Apr., 1918.]

Cramer has made a study to determine in greater detail than by past methods, the secretory activity of the cells of the suprarenal medulla. For Cramer believes that a hyperthyroidism denotes a slight but continuous hyperadrenalism. The chemical heat regulation of the body he also believes to be dependent upon an autacoid mechanism of which the thyroid and suprarenals form a part. He finds the chromaffin reaction inadequate to discover the finer changes occurring during the functional activity of the suprarenal cells. Ordinary fixatives also give misleading results. He therefore used osmic acid in the form of a vapor, and with this method obtained an excellent picture of the medullary cells containing the adrenalin granules. The test was applied to the suprarenal glands of rats and mice in which the alteration in the functional activity of the glands was produced by thyroid feeding, exposure to cold, injections of  $\beta$ -tetrahydronaphthylamine and of cultures of organisms of the vibron septique type isolated from cases of gas gangrene. Very clear evidence was obtained of distinct changes in the medullary cells. Intense secretory activity induced by injection of tetrahydronaphthylamine showed clearly the passage of adrenalin granules into the blood vessels of the medulla. Exhaustion of the glands by vibron septique or cold cause the granules to disappear. Also when increased functional activity of the glands is induced fine black granules, which may be actually adrenalin, or presursors of it, appear in the cortex. This shows that functionally the medulla and the cortex are not two independent organs. The adrenalin granules gradually disappear after the animal's death, though if kept cold they remain for a longer time. This, it is suggested, might be elaborated into a medicolegal test.

Cramer reports also on the value of the histochemical method of studying both the activity of the suprarenal gland and its load of ad-



renalin at the same time without operative interference. The load merely represents the balance between formation and excretion but the actual functional activity can be measured after artificial stimulation such as the injection of tetrahydronaphthylamine. As the histological examination reveals a massive secretion into the blood from the medullary cells, so also the depletion of the gland is matched by the new formation of adrenalin, to which the depletion seems to be the stimulus. If the animal dies as a result of the injection it manifests labored breathing and convulsions during the first stage of massive secretion and the post-mortem findings are those of toxic doses of adrenalin. Depletion from infections, which is due to exhaustion of the medulla, is not followed by new formation of adrenalin. When animals exposed to cold do not show good resistance to it, the rate of adrenalin formation does not keep pace with adrenalin secretion. Then death results. A balance of secretion and new formation has been shown also to follow splanchnic stimulation. Severe hemorrhage depletes the gland through active secretion at first, without new formation, but if the hemorrhage is arrested and the animal kept warm new formation takes place. Post-operative shock increases the secretion of adrenalin but here the medullary cells present a vacuolated appearance. [J.]

## II. SENSORI-MOTOR NEUROLOGY

### 1. PERIPHERAL NERVES.

Langley, J. M., and Hashimoto, M. ATROPHY OF DENERVATED MUSCLE. [Journal of Physiology, April, 1918.]

These authors have made a study of the effect of treatment upon denervated muscle and conclude that neither the use of the galvanic current, production of contraction, passive movements, nor massage—which include all of the present modes of treatment of such muscle—can do more than slightly delay atrophy. It would seem that any one of them might be supplanted by a method equally beneficial but not requiring such expenditure of time or money. It is especially difficult in man to measure the effect of other treatment since it is too much obscured by variability in time of recovery as well as by unascertainable conditions at the point of suture. Measurements of the limbs at intervals of stimulation cannot be relied upon, since connective tissue growth may have been caused. Growth of muscle would moreover mean that atrophy could altogether be prevented, which is more than one can at present claim. The only other method of testing, to which these experimenters could resort, is that of comparing the electrical irritability of the muscle that has been treated with that which has been left alone. In order to minimize the errors that must arise a great number of experiments were made upon animals and careful watch was kept for error. The experiments were made only during the earlier

stage of atrophy, when it would seem that treatment would be more likely to produce its effect. Still in the later stage conditions are different, since the arteries gradually recover tone and there may be a change in the quantity of blood flowing through the muscles. Only one experimental method of treatment appears to offer any hope of considerably reducing the rate of atrophy, and this is ionization with a potassium salt, and even this gave a positive result only once out of three experiments.

**Dustin, A. P.** NERVE INJURY AND NERVE REPAIR. [Ambulance d'Océan, July, 1918.]

Dustin here furnishes a remarkably complete account of the microscopical changes in the central and peripheral segments of injured nerves, based on the examination of cases varying from a few days or less to a couple of years or more in duration. A painstaking description is given of fibrillation of the axones, the spirals of Ranvier-Perroncito, the irritative and regenerative phenomena in the syncytium of Schwann, the reactions in vascular and connective tissues, all of which are illustrated by beautifully clear drawings. In a subsequent section attention is directed to the difficult question of the mechanism of nerve regeneration and the interpretation of the microscopical picture. Here, we venture to think, Professor Dustin scarcely does justice to the arguments of the peripheral school, as one may say, who hold that regeneration in the isolated peripheral section of a cut nerve is a histological fact. He has not, apparently, had a chance of referring to the work of the late Dr. Alexander Bruce on multiple neuromata of the central nervous system, by which study the possibility of peripheral regeneration is materially strengthened.

For that matter, Dustin's fine research work seems to have been devoted disproportionately to the changes in the central ends of injured nerve-trunks. Be this at it may, one of the more convincing sections of the paper is concerned with the orientation of the regenerating axones across the cicatrix to the peripheral end according to the principle of what he terms odogenesis, in opposition to the more commonly accepted view of neurotropism. Cajal supposes, in the case of the latter, that substances are actively secreted by the proliferation of the cells of the sheath of Schwann, which substances exercise a chemiotropic action on young axones and so orient them into the appropriate channels. Nageotte has raised the serious objection that if this were the case young developing axones would never leave the central ends of the sheaths in which they already find themselves. By odogenesis is meant the process whereby young axones follow paths formed by embryonic connective tissue cells and by the cells of the sheath of Schwann; through interstices thus made the axones penetrate to the peripheral end. The last section is assigned to a consideration of many practical points dealing with the technic of operative interference.

**Mackenzie, A. J.** REPAIR OF LARGE PERIPHERAL NERVE GAPS. [Surgery, Gynecology, and Obstetrics, Oct., 1918.]

The author draws the following deductions from a limited number of cases: 1. Regeneration and recovery of function are promoted by the use of nerve flaps. 2. Both central and peripheral flaps can be used for such purposes. 3. A peripheral flap, by laying down a nerve path, may promote regeneration over a great gap. In one case quoted regeneration occurred over a gap ten and three quarter inches in length. 4. The approximation of nerves and their repair should be done in all cases with the least possible delay. This would apply as well to cases which are infected as to clean cases. 5. The arrest of trophic shock can be promoted by early closure of large gaps by flaps. 6. Unimpaired nerve tissue should always be utilized for the effective repair of damaged nerves. 7. In their repair, nerves can be successfully sequestered in muscular tissue so as to promote their own regeneration and that of the muscles in which they are imbedded. 8. The principle of sequestration can be utilized in proper cases so as to avoid infected zones in wounds and also scars and other obstacles to nerve repair.

**Lehr, A.** - A PLASTER OF PARIS AND SPRING APPARATUS FOR PARALYSIS OF THE EXTERNAL POPLITEAL NERVE. [München. med. Wchnschr., 1917, 64, 1413.]

This appliance consists of plaster of paris leg and foot pieces, united by wire springs on the inner and outer sides. The springs are made of soft telegraph wire, 5 mm. thick, which is wound round a broomstick; three turns around the latter form the joint for each side of the ankle. When these turns have been made the wire is removed from the broomstick and tried against the ankle of a normal person. One end of the wire should be made to lie against the side of the middle of the foot; the other should run up the side of the leg and should be left irregular and not straightened out, so that it may hold better in the plaster. This soft wire is better than steel wire, because it can be manipulated with simple instruments. As a lining for the leg piece, a piece of tricot or stockingette is used. The foot being held in the correct position, a plaster of paris bandage is applied around it and another around the leg. The wire skeleton is then held in place, care being taken to keep the ankle position properly centered; more plaster of paris bandages are then applied. When the case has set the anterior part of the leg section and upper part of the foot section are cut away, and it is removed from the leg. The edges are smoothed, and the splint dried in the sun. The edges of the tricot can be pulled over the edge of the plaster and fixed with water-glass.

Privat et Bellot. APPARATUS FOR PARALYSIS OF THE RADIAL. [Arch. méd. belges, 1917, 70, 9.]

The writer, in an article in the *Presse Médicale*, showed that the resistance of an apparatus for this paralysis ought to be estimated from the condition of the opposing muscles, and not from that of the muscles innervated by the injured nerve. In other words, the resistance of the apparatus must vary directly with the strength of the flexor muscles, and be weak or strong according as those are weak or strong. This formula was accepted as correct at the *Congrès interallié pour la Rééducation professionnelle des mutilés de guerre* by the delegate from the *Société de Neurologie* and by the chairman of the section. Two criticisms are therefore submitted as most usefully applying to many of the models exhibited at the Congress.

(i) *Abduction and Adduction of the Wrist*.—Most of the apparatus shown allowed lateral movements at the wrist. These, however, are prejudicial to the full use of the hand in a patient with paralysis of the radial. For the proper working of an apparatus so that it can effect any given movement it is necessary that one of the groups of muscles governing or opposing the movement should be preserved, for in that case, whilst the paralyzed group is replaced by elastic force, the unaffected group will exert a moderating influence on the artificial muscle, so that the patient is able to direct and estimate the movement he wishes to make. But if the too opposing groups of muscles are paralyzed the movement is no longer under control, for the articulation is loose; consequently it is of advantage to do away with any play in this.

This is exactly what happens in a case of radial paralysis. The abductors and adductors of the wrist are paralyzed, but it is harmful to allow the apparatus to produce these movements at the wrist.

(ii) *A Fixed Stop*.—The chief fault of nearly all models was heeling over when a firm grasp is made, and Privat and Belot condemn the means adopted to remedy this. These are either complete immobilization of the wrist in some selected position or allowing a certain range of movement at the wrist, with the sudden restraint of a fixed stop. They consider complete immobilization to be as bad as the stop in all apparatus intended for reëducation and in the so-called standard models. Such a fitting in a standard model bruises the wrists when abrupt movements are made, like using a hammer, a plane, an axe, and so forth. Much to be preferred to this rough check is the more pliant one afforded by the elastic spring action of a shock-absorber, the resistance of which is adaptable to the effort to be made.

In the models for reëducation the stop is mischievous, because it prevents all work of the paralyzed extensor muscles. The action of these is either to raise the hand or to collaborate with the flexors of the fingers. But, on the one hand, the position of the wrist in extension is effected by the spring, and on the other when the flexors are contracted

the stop provides the resistance which ought to be, but is not, effected by the synergic contraction of the extensors. This can readily be realized. When the fist is tightly closed the fleshy bodies of the extensor muscles can be felt on palpation to harden and increase in volume. If the hand is then supported by an assistant, who pushes upon it as if to produce extension of the wrist, the contraction of the extensor muscles can be felt and seen to subside, their action having been replaced by the hand of the assistant.

**Weitz, N.** TREATMENT OF RADIAL NERVE PALSY. [Deut. med. Wchnschr., 1916, 44, 1351.]

The author combines nerve suture with tendon transplantation because of the considerable delay in the recovery of this nerve after neurorrhaphy. His method is as follows: The limb is rendered bloodless and skin incisions are made over the flexor carpi radialis and ulnaris tendons respectively, and these muscles separated from their attachments to the base of the second and third metacarpals, and the pisiform bone, and freed as far as possible. Then the attachments of the extensor carpi radialis longior to the dorsum of the second metacarpal and the extensor carpi ulnaris to the dorsum of the fifth metacarpal are exposed. With sinus forceps a canal is made subcutaneously in a slanting direction from the last-mentioned points towards the flexor side, and with it the cut tendons are pulled through. The tendons are fastened with three to four silk sutures to these points, the hand being kept hyper-extended. The skin is sutured and a splint applied for a fortnight, supporting the hand in hyper-extension. Daily baths, massage, electricity, radiant heat, and movements are applied, the splint being left off at the end of the fortnight.

In cases of division of the sciatic nerve the author recommends a combination of neurorrhaphy with pleating of the tendon of the extensor communis digitorum to prevent dragging of the foot.

**Privat et Bellot.** EXTERNAL POPLITEAL PARALYSIS APPARATUS. [Arch. med. belges, 1917, 70, 9.]

Most of the models intended to correct the disablement of this paralysis are inefficient because insufficient attention has been paid to the difficulties in walking. A patient with this paralysis is obliged to raise his knee when the leg swings forward so as not to catch the ground with the point of the foot. The deformity is well known and easily recognized, and is the only symptom of importance. The fatigue caused is slight, and the habit is soon formed. Less known, because less noticeable, and because the patient makes no complaint until he returns to ordinary life, are the pains caused in walking during the stage of resting on the foot. These are, nevertheless, the most troublesome. The cause of the pain digers with each of the three stages of planting the foot on

the ground. First of all, the heel, with its ample padding, is no longer the first part of the foot to reach the ground, which, on the contrary, is struck suddenly with the point of the foot, and by its outer edge as well—parts very much less protected—and corns frequently result. Then, during the period of complete support upon the sole, that part is forced to adapt itself to the lie of the ground on which it is resting, so that when this is not quite level or is sloping the foot is twisted; the axis of the leg is not in the same vertical line with that of the *os calcis*. The pressure of the weight of the body increases this deviation because the contraction of the tibial and peroneal muscles is no longer able to limit the twisting of the foot, and the result is painful wrenching of the ligaments—the mechanism of a sprain.

During the last stage of support, when the heel is raised, the foot no longer rests on its point, the inner border of the metatarsus is no longer kept on the ground by the *peroneus longus*, and the whole of the propelling action is thrown upon the fourth and especially fifth metatarsals, which are not protected by natural padding, and are already sore from the effects of the first stage of support.

A good apparatus ought to make walking correct and painless, and it must, therefore, fulfil these requirements:

1. Prevent high-stepping by raising the point of the foot when the leg swings forward.
2. Fix the foot firmly in such a way as to prevent distortion, *varus* or *valgus*.
3. Be as little conspicuous as possible.

The reason why operations have been suggested to replace instrumental support is that the models have been designed to correct high-stepping, whilst the function of the foot in the supporting stage has been overlooked. It is quite easy to ascertain that the muscles supplied by the external popliteal are almost flaccid whilst the leg swings forward, but are firmly contracted when the foot is being rested on.

Normally the muscles in front and on the outer side of the leg are least in action when the leg swings forwards, only raising the point of the foot. As soon as the heel touches the ground the muscles raising the foot contract firmly, their tendons standing out in front of the instep, and their bellies becoming prominent in the leg. Their action is directed to opposing the weight brought to bear by the body upon the back part of the *os calcis*, and tending to bring the sole suddenly into contact with the ground; they correct the splaying out of the foot up to the time when the axis of the limb becomes vertical.

Whilst the body is supported on the foot, when walking on uneven ground the foot can be placed in *varus* or *valgus*. The muscles supplied by the external popliteal then play a fresh part, which is to support the angle, opening inwards or outwards, formed by the axes of the leg and the *os calcis*, which the whole weight of the body tends to alter.



Lastly, when the heel is raised from the ground the peroneus longus contracts so as to lower the inner border of the metatarsus and propel the body forwards.

The due recognition of these facts shows the uselessness of any apparatus which is simply attached to the point of the foot, for that will only succeed in the subsidiary action of clearing the toes off the ground as the leg swings forward. The same objection applies to lateral supports, which are only able to effect a similar action because the much greater effort thrown upon the foot during the stage of support is not provided for.

The apparatus designed by Privat and Belot, based upon an exact consideration of the functions of the muscles supplied by the external popliteal, may very likely not be the best. Such as it is, it allows a correct gait, free from pain, and is not very conspicuous. It can be improved in both its action and its appearance, but the question of cost has been borne in mind in the design, while at the same time every care has been taken to ensure all the conditions indispensable to successful working.

The following results have been secured: (1) The net cost of production to the state, with military labor, varies between two and three francs, which is a very much lower price than that in the list published by the Orthopedic Commission for that class of apparatus, in which the maximum is ninety francs; (2) the patients who have been fitted with the mechanism do not want to leave it off, and ask to be allowed a second in case of accident; (3) its low cost enables a patient to have several for fitting to different boots. Many of them have fitted it to their sabots.

**Cone, H.** PATHOLOGY OF PERIPHERAL NERVES IN GUNSHOT WOUNDS.  
[Br. Med. J., 1918.]

Specimens from about 200 cases of war injuries of peripheral nerves are here reported. The patients were soldiers who came for repair of the nerves months after the original injury. The original wound had generally healed, yet it was considered advisable to wait until the lapse of six months after the injury before operating on the nerve; a few of these patients were brought to the operating table earlier, but many were not operated on for a year or more after injury. Many of the old healed sinuses suffer serious infection if operated on before the lapse of six months. In a few cases examination of material from the depths of the old wound shows masses of small round cells with few bacteria; some grow staphylococci on culture; others are negative. Many of the nerve trunks examined present masses of small round cells among the fibers; a few contain polymorphonuclear leukocytes. The vascularity is invariably greatly increased, new capillary vessels and full grown arteries and veins being found in all cases throughout the

specimens. The fibrous scar between the nerve ends contains young nerves in 90 per cent. of cases. The increase of connective tissue is seen along the fibers some distance from the point of severance. Mixed with it is a proliferation of young nerves intertwining with capillary vessels among the old nerve fibers. This neuritis Weir Mitchell and Tinel say is often due to hemorrhage into the nerve.

Cone has never failed to find nerves in painful scars. The peripheral portion of a severed nerve contains axis cylinders in 86 per cent. of observations. The new connective tissue within, between and around injured nerves is most commonly wavy and vascular, often cellular, seldom dense. Nerve tendrils grow about foreign bodies such as khaki, hair and sutures. They grow well in granulation tissue. Fat is a better medium for nerve growth than is muscle. Nerves grow into fascia lata when used as a covering. Cargile membrane is impervious to nerve growth. A stretched nerve shows active growth of young tendrils. Circular constricting scars are particularly damaging. Young nerves grow wildly, most prolifically, and are hard to keep from growing. Pain may be caused by this great proliferation. [J. A. M. A.]

## 2. CRANIAL NERVES.

**Clark, H. S.** FAMILIAL MACULAR DEGENERATION. [J. A. M. A., Nov. 30, 1918.]

Since its first observation and reporting by R. D. Batten in 1897, a few cases of this condition have been observed and two new ones of the type with dementia are reported by the author. It is characterized by symmetrical affections in the two eyes consisting of dark spots in the macula and pallor of the optic nerve heads. It belongs to the type of degenerative diseases such as the amaurotic family idiocy of Tay and Sachs. Combined with this type of macular degeneration they find cases of dementia, the maculocerebral type, such as the cases here described. Summarizing the findings in the cases of macular degeneration with dementia they have been able to form a definite syndrome, though some cases vary in details. Clark is inclined to regard macular degeneration with and macular degeneration without dementia as the same disease. Etiology is unknown and syphilis is strikingly absent. The disease starts almost at puberty. Consanguinity is not essential though it may be a contributing factor. Heredity must be considered, of the collateral rather than of the direct type. The loss of mental faculties is gradual in the demented conditions. Its pathology and treatment are still unknown. The cause of the nervous degeneration in the ganglions of the retina and central nervous system is suspected by Clark to be due to degeneration of the neuro-epithelium. The relationship of these neuro-degenerative conditions like this and the others mentioned needs further study.

**Klauber, E.** EDEMA OF THE OPTIC DISK IN BRAIN INJURY. [Klin. Mbl. f. Aughkl. Apr., May, 1918.]

Klauber reports upon two groups of cases of injury to the skull comprising 72 cases each. The complication in the first group consisted in injury to the bones of the skull and of these 2.8 per cent. of the cases had papillary edema, two of these cases proving fatal. In the other group the dura mater was punctured. 32 per cent. of these died, 30.6 per cent. had papillary edema. The cause of the edema is believed to be in an endocranial stoppage of the lymph and it occurs in infected wounds of the brain chiefly in wounds of the back of the head. Klauber considers it "in a certain measure a prolapse of the brain into the viscera of the eye." He examined 6 cases histologically. Only a smaller number of these showed infiltration of small cells into the papilla. There was edema in the optic nerve trunk decreasing from before backward. Klauber does not consider the subarachnoidal dropsy in the ampulla and the descending perineuritis and interstitial neuritis in the hinder parts of the optic nerve, which are connected with the terminal meningitis, as essential to the appearance of the papillary edema.

**Lewis, F. P.** RETINAL HEMORRHAGE. [J. A. M. A., June 15, 1918.]

Dr. Lewis reports a case of retinal hemorrhage. A woman had been suffering from recurrent hemorrhages from the retina and had been under the advice and observation of competent specialists for eight months. Elimination by the kidneys and skin was the chief treatment used. She had no arteriosclerosis; her blood pressure was only 120 mm. of mercury, but she had marked leukocytosis. Her age was only 46 years. Five years before she had an abscess of the antrum which had apparently recovered, though when it was subsequently opened a quantity of sterile pus was removed. Pyorrhea was very evident, and the roentgenogram showed apical abscesses of several teeth. The infected teeth were removed, and cultures made. These showed that the active organism was the *Streptococcus hemolyticus*. The removal of the teeth was followed by cessation of the hemorrhages. In another case of recurrent hemorrhage in a man, aged 70, with a blood pressure of 200 mm., the same cause was suspected, and the same organism found. He was treated by autogenous vaccines, and the hemorrhages ceased. Lewis says that retinal hemorrhage is much more frequent than generally supposed and is not dependent on blood pressure. "It may be associated with, but is not directly caused by, arteriosclerosis, albuminuria, diabetes or other diseases involving disturbed metabolism or focal infections. In any of these conditions, protein toxins may be given off. These are easily absorbed into the circulation, more especially when they arise from focal infections that are proximal to the eye. The organism which is most commonly present is the streptococcus, and the form frequently found is that of the *Streptococcus hemolyticus*. The hemorrhage thus

produced is not the result of force from behind, but is due to softening of the tissues of the capillary or arterial walls by the local action of this toxin, thereby producing lysis." This, the author says, is a new conception as regards a cause of retinal hemorrhage, but it establishes a definite etiology of the condition and that is of value. The differential character of the toxins given off by the different strains of bacteria has not yet been studied, but it is known, however, that several varieties produce hemorrhage, and Wells considers it quite probable that of the chemical agencies causing hemorrhage bacterial products are the most important, and Lewis thinks that changes in blood pressure are practically negligible as causes of retinal hemorrhage. This adds also to our understanding of hemorrhages in other parts of the body. In cerebral hemorrhages it is more likely, from whatever source it comes, a protein poison is responsible, weakening the endothelium and causing rupture.

**Wallis, G. F. C.** OPTIC NERVE, CHIASM, AND SPHENOID BONE. [Practitioner, Jan., 1917.]

The author opposes the orthodox teaching, still largely repeated in the texts, that the optic chiasma occupies the optic groove of the sphenoid bone. As this question has a bearing on many pathological conditions, he has restudied the anatomy of this region in a number of post-mortem subjects. In only one of the eleven bodies examined was the chiasma approaching the more generally accepted position. In this subject, a female aged 93, more than one-half of the chiasma rested upon the optic sulcus and the olivary eminence. The author concludes that while the chiasma does occasionally rest on the optic sulcus, it is nearly always posterior to it. As to the antero-posterior diameter of the chiasma the smallest dimension in the subject examined was 7 mm. and the greatest 11 mm. Measuring the length of the intracranial portion of the optic nerve he found the shortest dimension to be 7 mm. and the greatest 12 mm. The diameter of the intracranial portion of the optic nerve is commonly about 4.5 mm., but may reach 7 mm. The length of the optic canal is usually extremely small (optic foramen), but sometimes the optic nerve is encased in a cylindrical canal of considerable length.

These observations, though based only on a few cases, show the bearing of sphenoidal sinusitis on affections of the optic nerves and chiasma with the consequent field involvement. In case the chiasma happens to be situated almost wholly in front of the pituitary body when that organ is diseased, it may possibly explain those cases where the symptom of bitemporal hemianopsia is absent.

**Koeppé, L.** NIGHT-BLINDNESS. [Mün. med. Woch., April 9, 1918.]

Hemeralopia, by reason of its present importance in military medicine, is restudied by this author. In contrast to earlier views which at-

tribute this visual defect to lesions of the nervous system, circulatory disturbances, retinal deformations, etc., the author attributes the cause to a diminished transparency of the cornea and lens. Evening light produces relative blindness, because the relative opacity of these structures intercepts the light rays, so that the point of retinal excitation is not reached. By means of a Nernst lamp provided with a slit thus giving enlargements the points brought out are capable of demonstration. Hemeralopic patients frequently show these changes, while by an ordinary visual examination no change of the cornea or lens will be detected. The writer believes that by his method hemeralopia in subjects who claim to have night-blindness can be proven to exist or not; thus it becomes an excellent test for malingering.

**Landolt, J.** NIGHT-BLINDNESS. [Presse Méd., 1918.]

Three classes are described by this author. False hemeralopia or nocturnal amblyopia is due, he thinks, to refractive errors including lesions of the cornea. True hemeralopias are due to retinochoroiditis, retinitis pigmentosa, choroiditis, etc., the effects of which on visual acuteness had been latent before the night life of the war. Those of the first group may require only glasses, while the second should be transferred to the auxiliary services. Hemeralopia due to poor food and malhygiene which yields rapidly to regimen makes up his third group.

**v. Stenitzer and Schroeder.** NIGHT-BLINDNESS AND LIVER OPOTHERAPY. [Hospitalstid., Apr. 17, 1918.]

Having made the casual observation that individuals who had eaten liver daily had escaped night-blindness when it attacked a given community, the authors decided to use cooked liver in the treatment of that affection. This idea is not new, especially in Scandinavian countries, for the authors refer to a discussion on night-blindness which appeared in 1904. in this same medical journal, where it was stated that this condition disappeared in tramps and vagabonds after the daily consumption for three successive days of half a pound of calf's liver. Ronne recently made a similar observation, but expressed a doubt concerning any possible specific activity of liver substance, maintaining that the benefit was due to the nutritive value of the liver. The authors subjected thirty-four patients with hemeralopia to exclusive liver treatment, 200 grams of steamed liver being fed them daily. Of this number thirty made complete recoveries and the other four were benefited. The duration of treatment varied from six to seventy-eight days. Most of the patients gained weight, from a fraction of a kilo to over 11 kilos. But at the same time twenty-four controls with night-blindness received no treatment at all, yet twenty recovered completely and three were improved. All controls also gained weight. A careful analysis of the two sets of figures showed nothing in favor of the specific liver treatment.

Hemeralopia follows fasting and abstinence periods and disappears upon an adequate diet, as has been shown by many observers, the nutrition disturbance seeming to involve either the nervous or interstitial elements according to underlying principles as yet not worked out.

**Bazy, L.** TETANUS AND THE WAR. [Lancet, Oct. 19, 1918.]

Bazy concludes that the experiences of war with reference to tetanus warrant the following conclusions: 1. Antitetanic preventive serotherapy is efficacious in the immense majority of cases. 2. When it acts incompletely it so modifies the course of tetanus that it has created new forms of the disease, unknown before its use was general. 3. The study of the check to serotherapy ought to lead (*a*) to use the serum in a more rational way; and (*b*) to know how to complete its action by that of an antitetanic vaccination. The pathogenic medication is the injection of antitetanic serum. The intracerebral route, supported by Roux and Borrel, has been almost abandoned. The intrarachidian route seems of little practical use.

**Kraus, W. M.** THE TRIGEMINAL NERVE. [J. A. M. A., May 18, 1918.]

Kraus describes the sensory distribution of the trigeminal nerve, pointing out the differences between it and the spinal nerves. The three distributions of the trigeminal nerve—segmental, radicular and peripheral—are shown. The terms “segmental” and “radicular” are often used interchangeably, and justly so when they apply to the spinal cord. This cannot be done in the case of the trigeminal. The paper is largely an explanation of the illustrations, though two cases are included, illustrating the segmental distribution and are reported to emphasize the necessity of having charts on which to indicate it. There are eleven illustrations, and without them the paper does not lend itself well to abstracting, as it is full of references to these.

**Sicard, J. A.** TREATMENT OF “ESSENTIAL” FACIAL NEURALGIA BY LOCAL ALCOHOLIZATION. [Boston Medical and Surgical Journal, September, 19, 1918.]

This paper states that the only effectual treatment of this disease is the destruction of the branches of the nerve, “local neurolysis,” by chemical substances, particularly alcohol. He uses alcohol, varying in strength from seventy to ninety-five per cent., and injects not over 1.5 c.c. under local anesthesia produced by novocaine or stovocaine, into the nerve in the foramina where it can be reached. Some of these foramina are superficial, the supraorbital and infraorbital; the opening of the inferior dental canal at the spine of Spix is medium; the foramen ovale and foramen rotundum are deep. He prefers to make the deep injections four or five days after the others, but sometimes makes all five injections at the same sitting. Care must be taken not to inject the



alcohol into a bloodvessel, as this may cause a gangrenous necrosis of the area supplied by the blood. The results are said to be remarkable, though relapses are apt to take place in from twelve to eighteen months. Certain conditions are indispensable to success. The first of these is that the case be one of the so-called essential variety, and the following points are given in differentiation: 1. Whenever the pain in facial neuralgia persists continuously with no distinct intervals of relief it is not a case of essential neuralgia. 2. Cases of facial neuralgia which, not having been already treated surgically or by local injections, are accompanied by cutaneous or mucous anesthesia, are not cases of essential neuralgia. 3. When facial neuralgia, previous to any intervention, presents associated signs of stimulation or paralysis of other cranial nerves, such, for instance, as trismus, diplopia, facial paralysis, lingual hemiatrophy, etc., it is not a case of so-called essential facial neuralgia. 4. A case of facial neuralgia which *ab initio*, involves the three branches of the trifacial, is not a case of essential facial neuralgia. In these cases we are dealing with secondary facial neuralgia of either exocranial or endocranial origin, *c. g.*, syphilis, tuberculosis, cancer, abscess, sinusitis, etc. In these the injection of alcohol, far from affording relief, may, on the contrary, aggravate matters. Nor is it of service in neuralgia following herpes zoster of the trifacial, for this is not a peripheral lesion. The second important condition is that every effort must be exerted to reach the nerve branches responsible for the pain. Cutaneous or mucous anesthesia of the area innervated by the injected nerve is the only evidence that can be obtained of a successful injection. This should supervene directly after the injection, and is accompanied by a sensation of induration and swelling, in reality nonexistent. These disturbances of sensation are very varied and peculiar.

**Pike, F. H., and Aronovitch, B.** FACTORS INFLUENCING THE ATTITUDE OF THE HEAD IN ANIMALS WITH INJURY TO ONE OTIC LABYRINTH. [Science, 1918, p. 519.]

Magendie, more than a century ago, recognized that the central nervous system participated in the maintenance of the attitudes of the body as well as in its movements. Recently Sherrington has called attention to this function under the head of the postural activity of muscle nerve. The attitude of the head is one of the characteristics of experimental removal of one otic labyrinth in animals, and the analysis of the factors involved becomes of importance from the point of view of the relation of the attitude of the head to the maintenance of the position of the body in space and hence, to the problem of the maintenance of equilibrium, as well as from its own intrinsic interest. This present analysis was begun by A. L. Prince more than two years ago and partly reported in Proceedings of the Society for Experimental Biology and Medicine, 1916, XIII, p. 156, but his services in a base hospital of the

American Forces in France led to an interruption of the experiments. A brief statement of new experiments at this time is contributed by these authors.

The torsion of the head, always seen after removal of one otic labyrinth, with the occiput turned toward the injured side, largely disappears after removal of the homolateral cerebral motor cortex in dogs. The torsion reappears if the heterolateral cerebral motor area is removed some weeks or months after the ablation of the homolateral area.

The torsion of the head is greatly increased, and the rolling movement toward the side of the injured labyrinth, together with the ocular movements (ocular nystagmus) reappear, if the heterolateral cerebral motor cortex is removed some weeks after the time of the labyrinthine operation. Rolling movements of the animal to the side of the remaining cerebral motor area reappear, but no nystagmus, if one cerebral motor area is removed some weeks after bilateral labyrinthine operation.

Our experiments have given a new interest to Magendie's statement that the division of the central nervous system into segments, *e. g.*, medulla oblongata, cerebellum and cerebrum, is an artificial division from the point of view of the physiologist, and that all parts must be considered together in arriving at an estimate of its functions.

### III. NEUROSES, PSYCHOSES.

#### 1. NEUROPSYCHOSES.

Lierault, G., and Coissard, E. WAR APHONIA. [Rev. de Laryngol., d'otol. et de Rhinol., Feb 15 and 28, 1917.]

The article gives the details of the various procedures employed in the treatment of war aphonia. These procedures consist of breathing exercises (the authors state that all such aphonic patients have a sub-normal respiratory capacity and the sooner this approaches the normal the more rapidly do the patients regain their voice), general calisthenics, laryngeal education or reëducation of the voice and tone placing as well as lip exercises. Until January, 1917, the authors had under treatment 82 patients; in 45 the treatment was successful; in 24 it was unsuccessful and 13 were still in course of reëducation.

Gilchrist, N. S. AN ANALYSIS OF CASES OF BREAKDOWN IN FLYING, WITH NOTES ON THE NERVOUS MECHANISM OF THE FLYING MAN. [British Medical Journal, Oct. 12, 1918.]

This author uses the term "breakdown" to describe patients rejected by the Royal Air Force Special Medical Board as permanently unfit, that is unable to fly for at least six months, more probably for years, and possibly never. He points out that the great difficulty is to distinguish between nervous subjects who will not make good flyers

and the highly strung, sensitive type, who is healthy otherwise and whose nerves are under control—a type who has proved over and over again the finest flyer of all. An analysis of 100 consecutive cases showed the cause of failure to be psychological or subjective, *i. e.*, loss of confidence or general breakdown, in 67 cases; objective nervous conditions in 14 cases; and physical complications in 18 cases. A careful review of the candidate's past nervous history will give valuable information as to his fitness for duty as a flying officer. Since an unstable nervous temperament is hereditary, the family history is important, 27 per cent. of failures giving a nervous family history; a nervous personal history (40 per cent. of failures) must also be considered, and nothing leads to failure more surely than a history of a serious nervous breakdown (30 per cent. of failures). The time at which such a breakdown took place makes little difference. In the case of observers who come up for training as pilots with a history of such breakdown, certain men of unusual strength of will and character may be accepted, if there are no active symptoms and if they have had a prolonged rest since the breakdown. In the qualified pilot much depends upon the cause of the breakdown and on the individual; if due to stress of service or malaria, recovery should take place; experience, however, has shown that few stand the strain of service long enough to justify their training. Dreams, nightmare, and somnambulism in infancy resulted in 21 per cent. of failures, and in adult life in 55 per cent. of failures. Such a history is a sign of an unstable nervous system, and the author points out that even a qualified flying officer should be free from nightmare for eight or ten weeks at least before commencing to fly again. Thirty-seven of the cases gave a history of concussion or shell shock. Candidates with a history of concussion with prolonged unconsciousness should be rejected except in very special cases; if followed by nervous breakdown, every case should be rejected. This applies also to shell shock. Qualified pilots with history of concussion may be employed again after two or three months' rest, if recovery has been speedy and has not been followed by nervous breakdown. However, they should be given light duties at first with dual control. Where there has been more than one attack of concussion, very prolonged rest is necessary. As a rule both in candidates and flying officers affections of the higher cerebral functions (which occurred in over 52 cases of the series) preclude future flying; they may make capable instructors after due rest, but as pilots they do not last even if they resume flying. Thirty-six of the cases gave a history of recent malaria, and Captain Gilchrist emphasizes strongly the fact that malaria is often the direct cause of a breakdown of the nervous system and especially of the higher cerebral processes. Under rest and appropriate treatment such cases do well. Exaggerated reflexes (82 cases) and tremor (73 cases) in themselves are not of importance. In deciding whether or not to reject a candidate who is

highly strung, a great deal depends upon the individual; the university athlete who has been trained to self-control will probably justify training expenses, but it is better to reject the introspective clerk with little experience of outdoor exercise or sport. Much depends also on the way in which such subjects are handled in training. They are sensitive of criticism and over-anxious to do well and should be encouraged rather than found fault with. Finally, medical officers who believe that the ailments of the neurasthenic are imaginary and can be voluntarily set aside should not be attached to flying schools, where the medical problems give scope for the finest scientific minds. [Med. Rec.]

**Honorio, F. Delgado.** EL PSICOANALISIS. [Anales de la Facultad de Medicina, Lima, Vol. 1, No. 2, March, 1918.]

First Chapter. This article presupposes no familiarity with the subject and is apparently intended to introduce psychoanalysis to the Peruvians. It treats briefly of the ontogenesis of the sexual instinct, the unconscious, repression, sublimation, compensation, the function and structure of dreams, the psychopathology of everyday life, and the significance of wit and the comic. Three other chapters are to follow: on the exposition of the mechanism of the neuroses and certain psychoses, on the technic of their treatment, and a criticism of some of Freud's doctrines. Although the author considers the psychoanalytic method "irreproachable," he cannot say the same for certain of Freud's hypotheses, and suggests some modifications of the latter.

**Macht, D. I.** THE MURDER OF HAMLET'S FATHER. [Johns Hopkins Bulletin, 1918, 29, 165. B. M. J.]

In a paper with historical, etymological, and pharmacological aspects, Macht brings out several points of interest in connection with the murder of Hamlet's father by the instillation into his external ears of the "juice of cursed hebenon," or hebona, as it is spelled in some editions. According to the original Hamlet story, the murder was committed with a steel weapon. The pouring of poison into the ears appears for the first time in Shakespeare's account, and was almost certainly adopted by him from the methods of Italian poisoners, as, indeed, is suggested by Hamlet's aside on the reënactment of the murder by the players under his direction: "His name's Gonzago; the story is extant and writ in choice Italian." The nature of hebenon or hebóna has long exercised Shakespearian scholars, and Dr. Macht analyzes the claims of the yew, ebony, henbane or hyoseyamus, hemlock, and belladonna. While there is plenty of evidence that the yew (*Taxus baccata*) is poisonous, there is none to show that the ebony tree is; but the English word "heben," yew tree, is derived from the Hebrew root, "eben," meaning a stone, and really refers to the harness and not to the color

of the wood, so that in the Middle Ages it was employed for any hard wood. There is also sound evidence in favor of the contention that hebenon is the correct reading and a synonym for henbane. Metathesis of consonants is not an unusual phonetic phenomenon. The toxic properties of henbane were well known at that time, and Holland's translation (1660) of Pliny, in which madness is mentioned as a result of instilling oil of hyoscyamus seeds into the ears, may have been known to Shakespeare. But, after all, it is probably impossible to be certain whether yew or henbane was meant by Shakespeare, and his poetic description of the symptoms does not help much in this respect. Macht has investigated experimentally the absorption of drugs and poisons through the external auditory canal and membrana tympani into the general circulation, and the production of constitutional symptoms. His results, which show that a number of drugs, such as aconite and nicotine, can be thus absorbed, will be published in full in the *Journal of Pharmacology and Experimental Therapeutics*, and provide a scientific justification for the aural administration of drugs, which has long been practised, and an explanation of their homicidal abuse in the past.

**Jelliffe, S. E., and Brink, L.** RÔLE OF ANIMALS IN THE UNCONSCIOUS. [Psychoanalytic Review, July, 1917.]

The authors call attention to the unconscious significance of animal life to human affectivity, which underlies the more obvious relationship and valuation of animals. This unconscious meaning consists of relics of long past relationships and conceptions, once but now no longer conscious. The present study was instigated by the finding through psychoanalysis of such remnants in the dreams and mental attitudes of psychoneurotics. This leads to a comparative study of the same manifestations as preserved in myth, folklore and other expressions of thought and phantasy life at different periods. The animal world offers to human psychical experience objects of fear either objectively, or as related to man's lower nature from which he must escape in his continuous evolution. They are symbolic of forces within and without, they provide substitute gratification for his instincts and they are the means of sublimation in the external use which man can make of them. These writers maintain that man is much more at the mercy of inner fears arising from his psychic conflicts after higher attainments than those occasioned by external relationships toward animals. The repressions which cultural advance necessitates give rise to neurotic fear.

The first dreams reported represent from a psychoneurotic history the use of animals both in a direct symbolic form and in a substituted form where conflict was expressed through the symbol of the animal form, which then served directly also as the conflict object upon which the conflict enacted itself. It represented the struggle concerning the mother, and was also the symbol of the libido and its striving. There

was also a shadowing of the victory over the conflict in the use of the animal symbolism. Neurotic symptomatic activities of this same patient revealed the double psychic attitude which both practises denial and in substituted form enjoys the forbidden exercise. Here the patient showed practises similar to many discovered in savage customs. The strongly erotic character present in these animal phantasies revealed striking similarity to the fables preserved in Ovid's *Metamorphoses*. These seem to represent a particular theriomorphic stage of phantasy development through which the human psyche passes and at which the neurotic lingers. The incest struggle in both patient and in earlier man is thrust over upon animals, which also represent gods, forming partially a symbolic form of gratification, partially a sublimation on an earlier plane of civilization. Animals were also used more directly to gratify and form a partial discharge of the eroticism and aggressive curiosity bound up with the incest problem. Sadism, self distrust and self depreciation are likewise symbolized. Suggestion is made by the writers of the contribution to the knowledge of unconscious thought content by the study of the animal rôle in psychotic manifestations and in superstitions concerning psychotic conditions. Such a rôle in the psychoses and psychoneuroses aids in interpretation of many phobias and in view of the analyses under discussion these show themselves as fundamentally sexual and incestuous. Attention is also called to the fact that these same features, the use and symbolism of animal forms, lie in the path of gradual culture and sublimation.







JAMES JACKSON PUTNAM

## Obituaries

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### DR. JAMES JACKSON PUTNAM

Dr. Putnam died November 4, 1918, of angina pectoris, with a smile, shaking hands with a friend. This was symbolic of his life. The friend was also his physician, again symbolic, because, whether he was helping, or being helped, Dr. Putnam's relation to the whole world was friendly. I say the last act of his life was symbolic because it epitomizes his spirit.

Did he know he was dying? Undoubtedly he was in deep distress. Only under such conditions could he permit, even, anyone being sent for on his own private or personal account. Rather, it was his habit and his custom, to respond to others' calls for help. Even in extremes, he thought of his friend, his physician, and true to type, his spirit immortalized itself in a final friendly handshake and a smile.

Universal was the feeling of Dr. Putnam's friendly humility. A man of immense attainments and widest vision yet he sought never to impose or force his views on others, leaving them utterly free to choose the better or the worse, rejoicing if they did the first, and sorrowing if they chose the second.

Dr. Putnam was born October 3, 1846. He was graduated from Harvard College in 1866, and from the Harvard Medical School in 1869, graduating from both with high honors. He married in 1886 Miss Marian Cabot, who survives him with four children.

Dr. Putnam belonged to a distinguished family. His father, Dr. Charles Gibson Putnam, was a physician of distinction and his paternal grandfather, Samuel Putnam, Harvard, 1787, was Judge of the Supreme Court of Massachusetts. His mother was the daughter of another physician of distinction, Dr. James Jackson.

After graduating from the Medical School, Dr. Putnam served at the Massachusetts General Hospital as House Officer. Then he went to Europe where he was a student at Leipzig and Vienna under Rokitsansky and Meynert. Later he studied in Paris and Berlin, and in London with Hughlings Jackson. He was a fellow student with Sir Lauder Breuton and was intimate with Sir Victor Horsley.

He was made Lecturer on Nervous Diseases at the Harvard Medical School in 1872 and later became instructor. From 1893 to 1912 he was professor, and from the latter date professor emeritus. He was appointed neurologist at the Massachusetts General Hospital in 1874 and

established there one of the first neurological clinics. He started in his own house a neuropathological laboratory out of which has grown the present department of neuropathology at the Harvard Medical School.

He was a charter member of the American Neurological Association. He was also a member of the American Academy of Arts and Sciences, of the Association of American Physicians, American Medical Association, American Association of Pathologists and Bacteriologists, American Psychopathological Association, American Psychoanalytic Association, and many local societies.

He published a great deal. There are about 100 titles including a life of Dr. James Jackson and a notable volume on Human Motives. Significant earlier papers were on Lead and Arsenic, Acroparesthesia and Combined Cord Disease.

Dr. Putnam was a pioneer from the first. Not only is this true of the papers just mentioned but he anticipated by twenty years more modern views in an article on the "Psychical Treatment of Neurasthenia."

During the last ten years of his life, Dr. Putnam devoted himself especially to supporting, ennobling, and developing a particular method of psychotherapy, namely, Psychoanalysis.

Psychoanalysis needed support because it was heartily denounced by many who have since sincerely become its friends. It needed ennoblement because, misunderstood, misapplied, it was capable of becoming a dangerous instrument in the hands of anyone who happened to be unscrupulous. Psychoanalysis needed development if it were to escape from the same dangers into which the patients it professed to help had fallen, namely, fixation and regression.

To these problems Dr. Putnam devoted himself with singular sincerity and honesty of purpose, preserving his wonderful friendliness to all and for all, even those who were betrayed by their emotions into polemical methods unworthy of themselves.

Dr. Putnam was not only renowned in American neurology, medical psychology and psychotherapy, he had also an international reputation of the highest. As a single instance in evidence I may mention the fact that Pierre Janet, M.D., of Paris, dedicated his book on the Medical Symptoms of Hysteria to him. As one doctor said, "his work became recognized and valued in Europe as well as here." A friend has written, "Craving even to be of service rather than to win renown, Dr. Putnam's years before his death were internationally known for his work in medicine and psychology."

Dr. Putnam was also one of the pioneers in the establishment and support of social service in hospitals. He gave time, thought and money to helping this movement along and to the establishment of social service workers in the various clinics of the hospital. He was active in helping the mental hygiene societies and the associated charities. In short he was a public-spirited citizen of the highest type.

No more fitting words can end this inadequate notice than those used by President Lowell of Dr. Putnam, "philosopher and saint."

L. E. EMERSON (Cambridge).

### NICOLAS ACHUCARRO

Nicolás Achúcarro died in April, 1918, at Bilboa where he was born thirty-eight years before. His life, though ended so early, had nevertheless been more than usually full of marked achievement. He received his preliminary education in Bilboa, where he obtained his baccalaureate degree. He then attended the Real-Gymnasium at Wiesbaden and undertook his preliminary medical studies at Madrid. Already there he manifested his interest and efficiency in anatomical studies, obtaining two prizes in this branch. He then spent one semester at the University of Marburg. After experience in chemistry, diagnostics and pathological anatomy, he completed his medical studies at Madrid, where he received the degree of Licenciado en Medicina in 1906. In 1906 he received from the same Faculty of Madrid the degree of Doctor en Medicina. Meanwhile he had pursued his anatomo-pathological studies combined with clinical experience with Professor Pierre Marie at the Hospice de Bicetre at Paris and then at the psychiatric clinic of Florence with Professor Eugenio Tanzi and Professor Emerto Lugaro and at the psychiatric clinic of Munich with Professor Kraepelin and Dr. Alzheimer. After receiving his degree in Madrid he again worked with both the two latter men in Germany. In 1908 he was appointed physician of the provincial hospital of Madrid but in the autumn of that year he entered service as histopathologist at St. Elizabeths Hospital, Washington, then the Government Hospital for the Insane. He resigned from this position in 1910 and returned to Spain.

Not only had he laid a broad foundation of instruction and experience in laboratory and clinical work under neurological and psychiatric authorities of several nationalities, but he stood also as the representative of the new school of Spanish neurology under the instruction of Señor Ramón y Cajal. His own investigations related especially to the normal structure, the evolutionary development and the pathological alterations of the neuroglia. His results in the knowledge thus obtained of the function and biological significance of this tissue and in the formulation of this knowledge proved his ability and judgment as an original investigator. He has published various reports of his anatomical and histological work in Spanish, French, and German. "Sur la formation de cellules a batonnet et d'autres elements similaires dans le systeme nerveux central" is published in Cajal's *Travaux du laboratoire de Santiago*. "Zur Kenntniss der pathologischen Anatomie des Zentralnervensystems bei Tollwuth" was published by Dr. Alzheimer in the *Histologische und histopathologische Studien*.

Doctor Achúcarro was a man of broad culture which was infused by an enthusiasm and a special ability to impart knowledge and inspiration as a teacher, so that his work still continues through the pupils which gathered about him. His intellectual brilliancy and his keen judgment were combined with a vigor and independence of ardor in his scientific pursuits and a nobility of character which won him both love and admiration from his associates and acquaintances. His was a career of great promise, which though so early broken off, has left a lasting impress and a living incentive to further progress in the field into which he threw his chief interest.

SMITH ELY JELLIFFE.



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## Original Articles

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### SECOND ATTACK OF POLIOMYELITIS, AFTER AN INTERVAL OF FIFTEEN YEARS

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For some years it has been generally accepted that one attack of acute anterior poliomyelitis confers an immunity upon the individual against subsequent attacks of the same infection. As a basis for this belief, there is a mass of both experimental and clinical evidence. The work of Flexner and others upon apes has shown that these animals have an immunity against inoculation with active poliomyelitic virus for long periods after their recovery from an artificially produced attack of this disease, while control animals similarly inoculated develop the infection. It has been shown that this immunity invariably exists after mild or even abortive experimental poliomyelitis in the ape. Flexner, Rosenau, and others have succeeded in producing an anti-poliomyelitic serum or antibody by means of which they have been able to protect the ape against experimental inoculation with the active virus. The experimental evidence thus tends very definitely to show that the virus of poliomyelitis is specific, that it produces specific antibodies, and that an attack of the disease is followed by a lasting immunity, just as occurs in the case of the other specific infectious diseases.

In the literature there are but very few instances reported in which there has been an undoubted second attack of this disease in the same individual. In the course of his writings on the subject of poliomyelitis, Wickman states that in a few instances the course of the disease has been marked by one or more relapses or exacerbations of the infection, these occurring usually within a few days or weeks of the original onset, or very rarely within a few months. The interval between such relapses is usually afebrile, and nearly always marked by partial resolution of the initial paralysis. The literature contains fourteen instances in which it would seem that the disease has followed a course of this type. There are but eight instances reported in which a second attack of poliomyelitis has occurred after an interval longer than four months following the onset of the first attack, and in two of these cases, the nature of the subsequent attacks seem very doubtful. Owing to the comparative rarity of these occurrences, and their bearing on the question of immunity, we believe that the case herewith reported, in which two separate attacks of acute poliomyelitis, with an interval of fifteen years of health, occurred, may be of some interest.

#### REPORT OF CASE

*History.*—Miss D. R., aged 18, of American birth and parentage, was admitted March 3, 1918, to the Cook County Contagious Hospital, with a complaint of general malaise, weakness, especially of the lower extremities, and inability to stand or walk. The onset, ten days previously, was rather insidious, with general malaise, and pain in the lumbar region and lower extremities which came on following gymnastic exercises. Associated with this was a mild febrile syndrome, and a catarrhal rhinopharyngitis which continued for four or five days. On the eighth day after the onset, she rather suddenly lost power in the lower extremities, so that she could neither walk nor stand. The paralysis of the left lower extremity was complete, of the right only partial.

*Previous Medical History.*—At the age of three years, there was an attack of acute anterior poliomyelitis, with febrile onset, paralysis of both upper extremities, and transient weakness of both lower extremities. Several months after this attack, almost complete recovery of the left upper extremity had taken place, and on the right side there was partial return of function, with, however, a well-marked residual paralysis of the deltoid, forearm supinators, and the intrinsic muscles of the hand.

Other contagious diseases, during childhood, comprised measles, diphtheria, pertussis, and varicella. Tonsillectomy was done in 1916.



Right hand of patient showing residuals of old paralyses.

General health, except for the illnesses recorded, has been good; habits and bodily functions normal.

The family history was negative.

*Physical Findings.*—The temperature on admission was 100° F., pulse rate 116, respiration 24. The patient was well nourished and well developed, comfortable, and not acutely ill. There was a hypotonicity of the posterior cervical musculature, and fairly marked flaccid paresis of the abdominal recti. Except for the extremities, the remainder of the physical examination was negative. The right upper extremity was 3 centimeters shorter than the left, and generally underdeveloped. There was a marked weakness and atrophy of the deltoid and the supinators of the forearm. The right hand was smaller than the left, with subnormal grip, marked atrophy of all the intrinsic muscles, and a laterally extended thumb. These changes in the right hand are shown in the accompanying photograph. Sensation and reflexes were normal. There was no abnormality of the left upper extremity except for slight weakness of the deltoid and supinators. There was a complete flaccid paralysis of the quadriceps group of the left thigh, and a less marked paralysis of the flexors of the left thigh and leg. There was a paresis of the external and internal rotators of the thigh, and of the extensors of the left foot. The same muscle groups were involved on the right side, but the changes were less severe. Sensation was normal throughout. The patellar, Achilles, and plantar reflexes were diminished on the right side, and entirely absent on the left.

*Laboratory Findings.*—The leucocyte count was 8,500. The urine was negative. The spinal fluid was clear, under slightly increased pressure, and contained 80 lymphocytes per cu. mm. Noguchi and Ross-Jones tests on the fluid showed the presence of a small percentage of globulin. No bacteria were found in the fluid on smear or culture. Wassermann tests on the blood and spinal fluid were negative. Blood cultures were negative.

*Clinical Course and Termination.*—The clinical course was comparatively uneventful; the paralysis had reached its maximum before admission to the hospital. There was no fever after the third day, and at no time did the temperature rise above 100.8° F. Plaster casts were applied to the lower extremities to prevent deformities; and on March 31, 1918, the patient was discharged from the hospital. At this time the function of the involved muscles was but very slightly improved. Six months later, under treatment with massage and graduated exercises, there was definite improvement; perhaps 15 to 20 per cent. of the lost function of the lower extremities was regained.

The earliest report which we have found of two separate attacks of acute poliomyelitis in the same individual is that of Caudoin, in 1879. His patient was a boy who at the age of 17 months had an

attack of the disease with paralysis of the left lower extremity; and at the age of 16 years, a febrile attack accompanied by a partial paralysis of the right lower extremity.

In 1884, Ballet and Dutil reported the case of a girl of 18 years who had at three years of age an attack of poliomyelitis involving both lower extremities, with rapid recovery, except for slight weakness and atrophy of the left leg. At the age of 12 years, she had a second attack, involving the upper extremities, with partial recovery; and at the age of 14, a third attack, with complete paralysis of the lower extremities. These authors have also reported in the same article two or three cases in which progressive muscular atrophy or similar degenerative lesions of the cord have followed at varying intervals of time upon a primary attack of poliomyelitis in infancy or childhood. These cases will not be detailed here, however, as they do not appear to have any bearing upon the question of immunity in poliomyelitis.

Auerbach, in 1899, reported the case of a child in whom two months following a febrile attack attended with paralysis of the left arm and leg, a second febrile attack occurred, with paralysis of the right leg.

Gowers, in the third edition of his textbook, published in 1903, refers to a case in which a second attack occurred, but gives no details.

Rudolph Neurath, in 1905, reported the case of a boy of five years, who at the beginning of August had an attack lasting for five days, attended with fever, pains in the arms and legs, and difficulty in walking; at the end of August a repetition of the symptoms, again lasting five days; on October 3 another recurrence, with weakness in the upper extremities, and death on October 5. Postmortem examination disclosed extensive degeneration of the ganglion cells of the anterior horns throughout the spinal cord.

E. Lövegren in the same year reported the case of a boy of 16 years, in whom there were two attacks at an interval of two weeks, with the first of which there were paralysis of the left leg, the second, paralysis of the extensors of the right thigh.

Wickman, in 1907, published some material on poliomyelitis, in which he discusses the matter of recurrences and relapses, and cites two cases of Medin's in which following a febrile period of 3 or 4 days, attended with paraplegia, there was an afebrile remission of 5 and 6 days respectively, after which there was a renewal of the fever, with marked aggravation and extension of the paralytic phenomena; and a case of Leegaard in which there was an interval of three weeks between two attacks.

Starr, in 1908, reported the case of a little boy with a poliomyelitic paralysis of the right arm, and a later developing pseudohypertrophic paralysis of both legs and the back; that there was in this instance more than one attack of true poliomyelitis, however, seems open to question. Starr cites a case of Geirswold (1905) in which there was an attack of poliomyelitis involving one leg, with apparent partial recovery, and nine weeks later a second attack involving the opposite leg; also two cases of Wickman's in which recurrence took place after an interval of eight weeks in one, and of three months in the other.

Sinkler in the same year reported a case in which the right leg was paralyzed in the first attack, with fairly good recovery, followed by a recurrent attack three weeks later with complete paralysis of the left leg.

Stephens, in 1908, reported a series of 135 cases of acute anterior poliomyelitis occurring in Victoria, and in the course of his article, he states that he has observed recurrence or recrudescence in the same child, but does not particularize.

Friedjung, in 1909, reported the case of a boy two and one half years of age, who at the age of 23 months had a febrile attack with paralysis and muscular atrophy of the left arm. Four months later there was a second attack, afebrile, with paralysis of the lower extremities followed by a pseudohypertrophy of the calf muscles. That the second attack was a true poliomyelitis seems very doubtful.

Sheppard, in 1910, reported three cases in which second attacks of poliomyelitis occurred. The first case is that of a girl aged 19, who at the age of 3 underwent an attack of poliomyelitis from which she recovered with a residual deltoid paralysis of the left arm. Sixteen years after this time, the girl became violently ill and within a week developed a distinct Landry type of paralysis, involving all four extremities, neck, back, abdomen, and temporarily the muscles of respiration, from which she recovered.

The second case is that of a boy aged 5, who had a transient attack regarded as poliomyelitis, during which there was for two days complete paralysis of both lower extremities, with rapid recovery. About ten months later, in July, he had an attack involving the right lower extremity, and terminating with a well-marked residual paralysis of the right thigh and leg.

The third case which Sheppard reports is that of a boy aged 4, who at the age of 3 had an illness lasting a few days, without paralysis, regarded as an abortive poliomyelitis. A year later, in



June, he had a paralytic attack of poliomyelitis involving the right lower extremity.

Hennelly, in the same year, reported the case of a child two and one half years old, who early in May, 1910, had an attack of poliomyelitis affecting the right leg, with recovery in one month. On June 28 of the same year, a second acute attack occurred, with paresis of both legs. A month later the child was able to stand, but still had toe drop and double flat foot.

Eshner, in 1910, reported the case of a young woman who had at the age of two years a febrile attack of three days duration, with pain in the right leg and back, attended with paralysis and moderate atrophy of the right lower extremity; practical recovery took place in eight months under treatment. At the age of thirteen and one half years, she had an attack of rather indefinite nature, without fever, coming on 24 hours after an injury to the left shoulder and elbow, attended with weakness and wasting in both hands, transitory on the right side and persistent on the left side. The author admits considerable doubt as to whether this second attack was really an attack of poliomyelitis.

Eckert, in 1911, in the course of an article on poliomyelitis, refers to a case from Heubner's clinic of a child who had in 1903 a poliomyelitic attack with paralysis of the left leg, requiring tenotomy. Six years later there was a second attack with paralysis of the right leg.

Lucas and Osgood, in 1913, reported the case of a child of five years who in February, 1910, had a paralytic attack affecting both legs, with a residual paralysis of the extensors of both feet and the peroneal group of the right leg, which still persisted two years later. In September, 1912, the child had a febrile attack accompanied by coryza and bronchitis, with a suddenly developing paralysis of the right arm, and an increased weakness of the right leg, followed by recovery of the arm. Four months after this attack, poliomyelitic virus was found to be present in his nasal secretion, sufficiently active in virulence that when injected intracerebrally into a monkey, it produced a typical and fatal poliomyelitis in the animal.

Sanz, in 1915, reported the case of a woman of 35, who at the age of one year had an acute poliomyelitic attack with paralysis of the left leg and foot, and at the age of 15 a second attack affecting the right leg and foot. At the age of 35, her paralysis still remained, the feet were cyanotic and in equinovarus position, and the patellar and plantar reflexes were absent.

Dufour, in 1916, reported the case of a young artilleryman 20

years of age who had a transient illness (poliomyelitis) manifested by headache, fever, and a flaccid paralysis of all the extremities, the entire attack lasting only three days. Six weeks later the patient had a second attack similar to the first, again involving all four extremities, and lasting one week, with recovery.

Taylor in the same year reported the case of a boy of 7 years, who at the age of 3 years had a febrile attack of 3 days' duration, followed by paresis of the right leg and left arm. Recovery of the left arm was complete within a few weeks, and although the child was able to walk again one year after this attack, there was a residual paralysis of the extensors of the right foot. At the age of 6 years, he had an entirely similar febrile attack lasting several days, and an extensive paralysis developing over night. Improvement began in about a week, and was most marked in the left arm and right leg; however, he was unable to walk for six months. At the age of 7, there was complete paralysis and marked atrophy of the muscles of the left leg below the knee, and the left foot was in equinus. In standing, the entire weight was borne on the right leg. There was considerable paresis of the muscles of the left thigh, and slight left dorsal scoliosis.

#### COMMENT

As regards their bearing on the question of immunity, the cases reported would seem to be separable into two groups; one group including those cases, fourteen in number, in which there were two attacks with a comparatively short interval between, not exceeding in any case four months, the other group including those cases, eight in number, in which the interval between the attacks was comparatively long, varying from two and one half to sixteen years. Lucas and Osgood have demonstrated that poliomyelitic virus in an active state may be present in the nasal and pharyngeal secretions of an individual who has had poliomyelitis, for a period varying from a few weeks to a few months after the termination of the active febrile stage of the disease. Lewellys F. Barker, in discussing the immunity conferred by an attack of acute anterior poliomyelitis in human beings, states that this does not always develop quickly. Upon the basis of these two observations, it would seem possible to explain a secondary attack of the disease or a relapse occurring after a short interval, as an auto-infection of the individual, under certain conditions, by active virus present in his own nasopharyngeal secretions, this infection occurring before the full development of immunity. Such an explanation does not, of course, eliminate the

possibility that in some or all of these cases, the second attack may be a re-infection from a new external source.

In the group of cases which we have cited, where there has been a long interval between the first attack and the second, we practically must consider the second attack as an entirely new infection from some external source. As to the status of immunity in these cases, we can only theorize. Perhaps it may be that in these individuals there has been a complete lack of formation of immune bodies; or, more probably, that the immunity produced by the first attack has been quantitatively insufficient or of insufficient duration to protect against the second onslaught of the infection.

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## STUDY OF THE CEREBROSPINAL FLUID IN THE DIFFERENT PERIODS OF SYPHILIS.

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Lumbar puncture has been practised systematically since the year 1912 upon all the syphilitics treated in the service of Prof. Dind at Lausanne. The number of patients punctured is large enough to make it interesting to note the facts ascertained. A previous study upon it was published in 1915 by Dr. Isenegger, who has given the results of 173 lumbar punctures. Today we have at our disposal observations upon 354 patients, all syphilitic, and as many have been punctured before and after treatment we have the results of more than 500 examinations of the fluid.

Dr. Isenegger has established that the normal lymphocytosis is on the average 2.4 per cubic mm., basing this upon the lumbar puncture of a certain number of non-syphilitic patients who may also be considered nervously sound (lupus, chancroid, balanitis simple, etc.). Although some authors—Marcel Bloch and Vernes in particular—estimate that a normal cerebrospinal fluid does not contain more than 1 lymphocyte per cubic millimeter, we believe that a much higher figure can be found in individuals perfectly healthy and we consider lymphocytosis as pathologically increased only when it exceeds 5.

The measurement of the pressure of the fluid does not give us in syphilis any very useful indications. It does not seem to be parallel either with the lymphocytosis or with the albumin content of the fluid, and its increase, especially frequent in nervous lues, is interesting to note without our being able to attach to it actually any great importance.

We will now review rapidly the indications which lumbar puncture at the different stages of syphilis have given us, from the point of view equally of the lymphocytosis, the albumin content and the Wassermann reaction.

1. *Primary Syphilis*.—This deals with hard chancres with no secondary manifestations. There were in all 76 cases, all punctured before beginning treatment. In 24 patients the puncture was made at a time when the Wassermann reaction in the blood was still nega-

tive. The average lymphocytosis in these cases was only 2.4; it was increased—that is greater than five—only twice (8 per cent.). Of the 52 punctures made when the blood Wassermann was already positive, the average lymphocytosis was 6.1 it was increased in 35 per cent. of the cases. We observed once a pleocytosis rising to 34.

Wassermann reaction in the fluid was tested for 59 times; 58 times it was negative and only once positive with a patient whose blood was equally positive and who presented a lymphocytosis of 9.

The albumin, precipitated by nitric acid and measured approximately by means of the scale of Bloch, remained generally within normal limits, 0.20 or 0.30 per thousand. We found it plainly increased (0.70 per cent.) in only two instances. In one of these cases the lymphocytosis was 1 and in the other 8; there was therefore no parallelism between content of albumin in the fluid and the number of lymphocytes. Nonne's reaction, disclosing the presence of globulins, is, so to speak, always negative at the beginning of the luetic infection.

2. *Roseola* (with or without persistence of chancre).—We had 84 cases of this. These were also patients punctured before treatment.

The Wassermann was positive in the blood 84 times, that is every time.

The average lymphocytosis was 8.2 per cubic mm.; it was increased in 40 per cent. of the cases.

The Wassermann reaction was tested for in the fluid 71 times; 10 times it was positive (14 per cent., and for these 10 cases the average lymphocytosis was 17.1. In the 61 fluids in which the Wassermann reaction was negative the lymphocytosis had an average of only 5.6. There exists a parallelism between the two phenomena in the sense that, when the reaction of fixation of complement is positive in a fluid, that fluid presents most often a lymphocytosis clearly augmented.

The greatest pleocytosis was 67, observed in a fluid in which the Wassermann was positive.

The albumin was increased in 45 per cent. of the cases; this is an average of 0.06 per cent. As a rule if the albumin is abundant there is also augmentation in the number of lymphocytes. The Wassermann in the fluid may be positive with a normal quantity of albumin.

3. *Mucous plaques* (without exanthematous lesions).—Twenty-five patients punctured. They all presented only mucous plaques and not large condylomata nor remains of roseola. The blood

Wassermann was positive 24 times, that would be in 96 per cent. of the cases. The lymphocytosis was increased 8 times (32 per cent. of the fluids); this was an average of 5, therefore inferior to the degree attained in the roseola. The fluid Wassermann was positive only once (4 per cent.); in this case the lymphocytosis was 4. Increase of albumin was observed in 30 per cent. Of the cases; it averaged 0.5 per cent.

4. *Large Condylomata*.—Thirty patients presented neither roseola nor mucous plaques. Blood Wassermann was positive in 100 per cent. of the cases. Lymphocytosis was increased in 27 per cent. of the cases with an average of 5.1. Fluid Wassermann was positive four times (13 per cent.). In one instance a negative Wassermann had become positive when a second puncture was made after a complete treatment with neosalvarsan.

The albumin content averaged 0.5 per cent., increased in 30 per cent. of the cases.

5. *Latent Syphilis*.—This treats of long-standing syphilis, 65 cases, already treated previously or of patients in whom the lues was incidentally discovered without their presenting active specific manifestations. In those of them in whom the blood Wassermann was positive (70 per cent.), the lymphocytosis, increased in 40 per cent. of the cases, showed an average of 8; for the patients in whom the blood Wassermann was negative the average was only 4.7 (increase in 30 per cent. of the cases).

Fluid Wassermann was positive 5 times in 64 examinations (7.8 per cent.). In one instance we found the Wassermann negative in the blood and positive in the fluid. This was in a long-standing syphilitic treated on several occasions. The albumin, increased in 35 per cent. of the cases showed an average of 0.6 per cent.

6. *Hereditary Lues*.—We had at hand only 6 observations. One small patient presented hydrocephalus with idiocy. His lymphocytosis was 67. If we exclude this special case, we have for the 5 others a normal lymphocytosis averaging 3.9. The blood Wassermann was positive in 100 per cent. of the cases, the fluid negative 6 times at the first puncture. In one instance it had become positive at a second puncture made after treatment the lymphocytosis remaining normal.

The quantity of albumin was not modified.

7. *Tertiary Syphilis* (gummata and ulcerations).—Forty-five patients were punctured. The blood Wassermann was positive for 77 per cent. of the cases. Lymphocytosis, increased in 37 per cent. of the cases, averaged 7.1. It was evidently the same whether the



blood Wassermann was positive or negative. The fluid Wassermann was positive 3 times (6.6 per cent.). Here also we found in one instance the Wassermann reaction positive in the fluid and negative in the blood. Increase in albumin was noted in 40 per cent. of the cases; it is most often parallel with the pleocytosis.

8. *Cerebral Syphilis and Meningomyelitis*.—Six cases. Blood Wassermann was positive 4 times (66 per cent.). There was marked pleocytosis in 100 per cent. of the cases. This averaged 51 lymphocytes per cubic mm., one case presenting an exceptional pleocytosis of 235, the 5 others giving an average of 15 lymphocytes. The fluid Wassermann was positive every time, even in the two cases where the blood reaction was negative. The quantity of albumin surpassed 0.6 per cent. only in the patient noted above who presented a lymphocytosis of 235; it reached in this case 1.5 per cent.

9. *Tabes*.—We punctured 13 patients. The blood Wassermann was positive 9 times (69 per cent.). The average lymphocytosis, which was 30, was increased in 11 instances (85 per cent.). It was still normal with the two patients presenting clear symptoms of tabes at the outset. Fluid Wassermann was positive 9 times at the beginning but after treatment by neosalvarsan or novarsenobenzol it became positive in the 13 patients (100 per cent.). Once, in a case of demonstrated tabes, the fluid Wassermann had become positive after treatment while remaining completely negative in the blood.

The average quantity of albumin is 0.6 per cent. Here its increase is generally proportional to the lymphocytosis.

10. *General Paresis*.—We were able to examine only 4 cases. Of course this means from the beginning of general paresis. So many of these patients having been diagnosed in the service and discharged successively into a special establishment.

The Wassermann reaction was positive all 4 times in the blood and the fluid (100 per cent.). The average lymphocytosis was 28; it was increased in every case.

The quantity of albumin, 0.8 per cent. on the average, was in each instance equally augmented. It attained a maximum of 1.5 per cent. in a case where the lymphocytosis was 12. On the other hand in another patient it was only 0.8 per cent. for a lymphocytosis of 51, which shows that the parallelism between the quantity of albumin and the number of lymphocytes is not by any means constant.

The results may be tabularized as follows:

	Average Lymphocytosis	Lymphocytosis Increased In	Wass. Fluid Positive	Blood Wass. Positive
Hard chancre (Wa. +) . . . . .	6.1	35%	1.6%	} 68%
Hard chancre (Wa. -) . . . . .	2.4	8%	0 %	
Roseola . . . . .	8.2	40%	14 %	100%
Mucous plaques . . . . .	5.0	32%	4 %	96%
Large condylomata . . . . .	5.1	27%	13 %	100%
Latent lues (Wa. +) . . . . .	8.0	40%	8.8%	} 70%
Latent lues (Wa. -) . . . . .	4.7	30%	5%	
Hereditary lues . . . . .	3.9	0%	0%	} 100%
			16.6%	
Tertiary lues . . . . .	7.1	37%	6.6%	77%
Meningeal lues . . . . .	51.0	100%	100 %	66%
Tabes . . . . .	30.1	85%	69% after neo,	} 69%
			100%	
General paresis . . . . .	28.0	100%	100 %	100%

*Influence of Treatment.*—By the treatment with neosalvarsan or with novarsenobenzol one obtains as a rule a modification of the liquid in the sense of an amelioration, at least as concerns the pleocytosis. The 80 per cent. of patients presenting at the outset a clear exaggeration of lymphocytosis have been notably and very rapidly benefited by the treatment. This is particularly the case for the pleocytoses of the primary and secondary periods.

We have been able to note in tabes most frequently a marked diminution in the number of lymphocytes. Following an intensive treatment with novarsenobenzol one tabetic passed from 51 leucocytes to 12, another from 56 to 20, a third from 30 to 2 and a fourth from 16 to 3. This rapid transformation of the lymphocytosis was not on the other hand accompanied by an equivalent diminution of the quantity of albumin. This remains most often at its high figure or it is even often shown to be increased upon a second or third puncture. There is therefore frequently disassociation between the two phenomena.

As for the Wassermann reaction in the fluid, we have proved in many an instance that it becomes positive under the influence of treatment when it is negative at the first examination. Following an injection of neosalvarsan (biologic reactivation) it can even become positive in the fluid while remaining negative in the blood. There is here the ascertaining of an interesting fact which, for this alone, shows of what utility a lumbar puncture may be when it has to do with fixing the etiology of a case of tabes. The syphilitic infection would be in danger of being contested if one were content with investigating the complement fixation in the blood serum alone.

We have unfortunately only very few observations upon patients treated solely by mercuric preparations and we are not able to say

whether, from the point of view of the diminution of the lymphocytosis, mercury gives results as satisfactory as salvarsan. A comparatively interesting study might be made between the action of the two specifics. Some researches have actually been made in this sense at Lausanne under the direction of Prof. Dind and some cases of pleocytosis submitted to mercurial treatment (cyanide), which we have been able to follow, seemed to us to be modified much more slowly than the average of cases treated slowly by neosalvarsan.

*Conclusion.*—Our observations permit us to confirm fully that which our master had already pointed out in 1914, that is, how frequent and early is the extension of the syphilitic infection into the meninges, since in the 35 per cent. by the cases of hard chancre the number of leucocytes was already increased at a time when the cutaneous or mucous manifestations were still totally absent or at least could not be demonstrated by our means of investigation.

It is the lymphocytosis which at first betrays the modifications in the fluid, when the quantity of albumin is still normal and when the generalization of the infection has not yet been demonstrated by the Wassermann reaction.

In the exanthematous stage 14 per cent. of the fluids gave a complement fixation. This figure is met with again much the same (13 per cent.) in the cases of large condylomata when, among the patients showing mucous plaques, the fluid Wassermann was positive only once in 25 cases. This curious difference is not easily explained. Are there anatomico-histological conditions favoring the passage in the fluid of bodies capable of becoming fixed in the antigen especially among the carriers of the condylomata or indeed do the condylomata result in a more abundant formation of these bodies? The modifications of the fluid seem at least to be in accord with the reactions of the skin and we may ask if we have not here a question of the phenomenon of *allergia*. This conclusion would support the idea which Prof. Dind has been one of the first to defend, that *allergia* is an essentially cutaneous phenomenon. The condylomata, cutaneous lesions, would provoke a violent reaction of the organism when the lesions of the mucous membrane alone would not excite the individual to defense in the same degree.

As soon as the syphilis localizes itself in the central nervous system, the cerebrospinal fluid constantly presents important modifications and it is of great value in investigation for fixing the diagnosis or for controlling the course of treatment. The Wassermann reaction should be specially made in these cases for it is rela-

tively frequent that it is positive in the fluid and negative in the blood.

This little study will make evident, we hope, the utility of practising lumbar puncture upon syphilitics. The operation presents besides no danger. In many hundred cases of punctures we have had no serious accident to record. The patients rarely complain of vertigo or headache but it is absolutely necessary that those who have undergone puncture should lie flat without a pillow for 24 hours. The quantity of fluid withdrawn should be as little as possible. Five cubic centimeters are enough for the enumeration of lymphocytes in the cell of Nageotte, the measurement of albumin and the Wassermann reaction.

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# THE INFLUENCE OF ALCOHOLISM IN THE PRODUCTION OF HALLUCINATIONS IN GENERAL PARALYSIS OF THE INSANE\*

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The frequency of hallucinations in paresis has been variously estimated. Mickle<sup>1</sup> thought that at one time or other seventy-five per cent. of all paretics were either hallucinated or illuded. He studied one hundred paretics, and found that 41 had visual, and 40 auditory hallucinations. Southard<sup>2</sup> found visual hallucinations more frequently than auditory, and somatic delusions very infrequently. In one group of 18 cases, many of which were reacting to their environment, non-specified hallucinations occurred in 27.7 per cent.; visual hallucinations in 22 per cent.; and auditory hallucinations in 11 per cent.; in another group of 20 cases, including euphoric and expansive patients, unspecified hallucinations occurred in 30 per cent.; visual hallucinations in 30 per cent.; and auditory hallucinations in 5 per cent. of the cases.

Osnato<sup>3</sup> studied 37 paretics. In one group of eleven abnormal paretics, hallucinations occurred in 2 cases, both of a depressed, apprehensive, persecutory type. De Fursac<sup>4</sup> says the frequency of hallucinations in paresis is a much disputed question. He quotes Christian and Ritte as believing that they are almost constant, and Wernicke as believing that they are frequent; whereas Magnan, Dagonet, Kraft-Ebing, himself, and others believe that they are rare.

A number of theories have been advanced to account for the occurrence of hallucinations in paresis. The most important will be mentioned.

1. *The Anatomical Theory.* This supposes that the variation in the symptoms of paresis, including the hallucinations, rests on an anatomical basis, and depends on (a) the chief anatomical location of the pathological process, and (b) whether the disease process is irritative or destructive, and (c) according to Southard the rela-

\* Read before a meeting of the Philadelphia Psychiatric Society, November 13, 1918.

<sup>1</sup> Hack Tuke's "Dictionary of Psychological Medicine."

<sup>2</sup> Southard, E. E., M.D., A Comparison of the Mental Symptoms Found in Cases of General Paresis with and without Coarse Brain Atrophy; Contributions of the State Board of Insanity (Massachusetts), No. 38, 1915.

<sup>3</sup> Osnato, Michael, M.D., Personality in Paresis, Journal A. M. A., Vol. 70, p. 434, Feb. 16, 1918.

<sup>4</sup> De Fursac and Rosanoff, Manual of Psychiatry, ed. 1913, p. 273.

tion between A and B. Thus disease chiefly located in the occipital lobes (Lissauer's paresis) gives rise to more or less characteristic symptoms, including hallucinations frequently. The anatomical theory has recently been elaborated by Southard.<sup>2</sup>

2. The theory of the previous personality of the patient. This supposes that a parietic who is grandiose, delusional or hallucinatory, as opposed to one who is simply demented, is suffering from a psychosis in addition to his paresis. This theory further supposes that the predisposing cause of the psychosis is closely related to the previous personality of the patient; in other words that a patient who has been defective, peculiar, psychotic or neurotic before acquiring paresis is very apt to become a "psychotic parietic." Osnato<sup>3</sup> has recently written about this.

4. *The Toxic Theory.* This supposes that some toxin, either endogenous or exogenous, is the cause of the hallucinations.

5. *Psychogenic.* This possible source of hallucinations has not been investigated in my patients.

Gordon<sup>5</sup> states that hallucinations in certain syphilitic individuals may be due to meningeal irritation, as evidenced by excitement and a spinal fluid lymphocytosis.

The present study was undertaken, to determine, if possible, what relation alcoholism has to hallucinations in paresis. The patients selected were those who have been in my wards throughout the duration of their illness, and from whose relatives a reliable history could be obtained. Inasmuch as many of these patients were admitted more than three years ago, it follows that by far the majority are now dead.

In a study of this kind it is necessary to consider the following:

1. *Diagnosis of Paresis.* Only those in whom the diagnosis of paresis was beyond doubt, were included in this study. Here a word must be said about excited paretics. Judged by the clinical course or autopsy findings, some of our patients have apparently fallen into certain groups: (a) True manic depressive insanity complicated by cerebrospinal lues. (b) Cerebrospinal lues complicated by excitement, doubtfully of a true manic type, ending in complete mental recovery, that is, no dementia. (c) Cerebrospinal lues, with a psychosis, ending in dementia, but not running the clinical course of paresis. It is only fair to say that some of these (c), at autopsy, have turned out to be paresis, but all do not seem to be paresis. (d) True paresis with excitement. Some of these cases resemble manic depressive insanity so much, that, in spite of the fact that it

<sup>5</sup> Gordon, A., M.D., Psychoses other than Parietic Dementia in Syphilitic Individuals, Journ. A. M. A., Vol. 69, p. 1403.



is known that the patient has syphilis of the nervous system, time alone can make the differential diagnosis.<sup>6</sup>

2. *Alcoholism.* Relatives sometimes withhold the real facts from a physician; sometimes after their confidence is gained they will tell them, or some other members of the family may give a correct history. Also of great importance is the question as to what constitutes alcoholism. I have divided my patients into total abstainers, occasional, moderate, and excessive users of alcohol. The most difficult to place are the steady drinkers. I do not believe that every person who uses alcohol steadily is necessarily an excessive drinker. It is true that in the case of the quiet tippler alcoholism may not be suspected until the development of some symptom such as peripheral neuritis; but such a person takes a little more than a little.

For convenience of study, it has been found advisable to divide the patients into a number of groups and subgroups. These do not necessarily confirm to the usual classification of paresis.

In the first large group are fifty-two patients who neither in their history, nor at any time during the course of their illness, showed any hallucinations. This group (group I) is to be considered as follows:

#### GROUP I (NON-HALLUCINATORY)

##### *Subgroup a (Non-delusional)*

(a) In this group there are twelve patients who at no time had any delusions of grandeur, and whose affectivity was as normal as possible in any patient with paresis, that is, there was the usual contentment, but not happiness or over-happiness.

##### *Subgroup b (Depressed, Chiefly Non-delusional)*

(b) In this group there were nine patients in whom depression was a prominent symptom throughout the illness. The group includes, as a matter of fact, a number of different kinds of patients. Both in the history and in the symptoms somatic complaints were frequent. One patient was self-accusatory; one patient had recurring attacks of depression; a number showed apathy or hostility, two refused food. One might suspect that hallucinations, illusions, or delusions of persecution occurred, but they were not demonstrated.

<sup>6</sup> An example of what kind of patients have been considered paretics is the following: R. M. has been a patient in the department since 1913. His illness started with a long drawn-out depression. He has cerebrospinal lues. At present he shows what may be termed premature senility. He has a speech defect. Regardless of the duration of the disease, mentally he is not a paretic. In this study there have been included only paretics who would be universally accepted as such.

Delusions of grandeur were present in five; two had attempted suicide.

*Subgroup c (Grandiose, Exalted)*

(c) This group includes eleven patients in whom euphoria and exaltation was a prominent symptom; all but one patient showed delusions of grandeur.

*Subgroup d (Maniacal, Manic Depressive Type)*

(d) This group includes five patients whose symptoms resembled that of manic depressive insanity, lasting practically throughout the course of the illness, and manifested chiefly by symptoms of mania and hypomania. In none of these patients did the illness start suddenly with a maniacal attack. In addition to flight of ideas and grandiosity, common to all, three patients were hostile, suspicious, or had ideas of persecution; one patient showed a muscle mannerism, a movement of his hand by which he killed his enemies; one patient said he saw God and heard Him talk, one patient enjoyed a lucid interval between his attacks.

Three out of these five patients had a bad family or personal history. The alcoholic incidence in this group of maniacal patients is high.

*Subgroup e (Fabricatory, Exalted with Pseudo-hallucinations).*

(e) This group includes fifteen patients, in whom fabrications were very marked. The patients who belong to this group were with few exceptions exalted, and even at times showed flight of ideas, and in this respect resemble the grandiose and maniacal patients, in which latter group fabrications were not infrequently present; but the patients in the fabricatory group were for the most part good natured and unsuspecting. All the patients in this group also have this in common: at one time or other their fabrications took the form of pseudo-hallucinations. The negro parietic especially is very apt to say that God talked to him; but it is very significant that one never sees these patients in the act of listening to a voice. Often these patients show pseudo-reminiscences, which add further to the belief that their alleged hallucinations are hallucinations or illusions of memory. A few examples will be quoted:

CASE 1. B. C., Hebrew, married, aged thirty-four, was admitted to the Philadelphia Hospital for the Insane, March 5, 1917. He was a travelling salesman; had always been known as a good sport; he gave a history of lues. When admitted to the hospital he stated that he tripled Rockefeller in his wealth, lived in the Bellevue-Stratford hotel and had a retinue of servants. He often visited Heaven in an aeroplane; on his way up he would stop on a cliff and engage in a fight with some

Indians. He described God and Heaven. A few weeks later he repudiated both his fabrications and his delusions of grandeur; he said it was all imagination. He was well enough to be paroled on the 16th of September, 1917. He was unquestionably a paretic; he has not been able to work since his parole.

CASE 2. The following case illustrates the difficulty of making a diagnosis of hallucinations. A. T., aged 32, was admitted to the Philadelphia Hospital for the Insane, July 6, 1916. He has had a number of lucid intervals, during which he repudiated his extravagant statements. On the evening of the 14th of April, 1917, he tried to escape through a window; when questioned by the nurse at that time he said that the voice of God in Heaven was calling him. The next morning, however, he stated that his brother had been below with an automobile, to take him for a ride. It was pointed out to the patient that he could never have forced the bars of the window, upon which he replied he had changed himself to a bird and flown out. When he was told that the night before he had heard a voice in heaven, he promptly answered that his brother was a saint in heaven and had been calling him.

Now did this patient have hallucinations, or are his replies to be considered wholly due to his facility for confabulation. Kraepelin<sup>7</sup> states that in this type of paresis, hallucinations do not play an important part, and adds that they usually consist in disordered imagination, such as hearing commands from God.

Of the fifteen patients in this group two were markedly depressed throughout their illness; one patient was of distinctly inferior make-up. The number of abnormal personalities in this group was from two to four.

The alcoholic incidence of this florid group of paretics is not high.

As contrasted with the group of fifty-two non-hallucinatory patients, there were in my wards twenty-one hallucinatory patients, eleven with visual hallucinations, ten with auditory hallucinations.

## GROUP II. VISUAL HALLUCINATIONS

### *Subgroup a (Delusional, with Depression)*

(a) In this group were four patients who before their admission to the hospital showed marked reaction to their environment. Ideas of persecution, excitement, apprehension, and ideas of poisoning were present. They are all considered to have had visual hallucinations, though the diagnosis of hallucinations and the type was at times difficult or uncertain.

<sup>7</sup> Kraepelin, E., M.D., General Paresis, Nervous and Mental Disease Monograph Series, No. 14, 1913, p. 79.

CASE 3. A. B., Italian, aged 33, was admitted to the Philadelphia Hospital for the Insane, December 9, 1916. Three years before admission he made unwarranted accusations against his wife, became irritable, and was subject to wild outbursts of temper. For several months previous to his admission he watched his wife very closely; one evening he nailed the windows of his house, because, he said, he saw his wife leave at night. (This may have been an illusion or else a falsification of memory.) He then became apprehensive, and thought his wife was plotting against him. While on the street one day with his wife he insisted that he saw fifty policemen on a corner.

On admission to the hospital he was excited, suspicious, and very apprehensive. His wife was his worst enemy. She wanted to take his life in order to obtain his insurance money, the amount of which was no less than one million dollars. The patient was much afraid of his father-in-law, who, he insisted, was in the next room. This statement was based apparently on an illusion or a visual hallucination, rather than on an auditory hallucination. He refused food. His wife stated that he had used alcohol very sparingly, and only occasionally. The patient showed among other physical signs a marked tremor of his lips; memory defect was in evidence. His excitement continued; he died six weeks after his admission to the hospital.

CASE 4. In this case the onset was with depression, suspicion, and apprehension with ideas of poisoning. At one time the patient searched the house with a hatchet for a supposed enemy. In the hospital the patient refused food; he possibly had auditory hallucinations. His delusions gradually disappeared, but even in his dementia there is a certain amount of depression and apathy. The diagnosis of visual hallucinations is not altogether certain; but probable. He had used alcohol moderately.

CASE 5. This patient was an Italian, with symptoms very similar to those of the preceding patient, including ideas of infidelity, persecution, and unpleasant pseudo-reminiscences. As with the preceding patient, the diagnosis of visual hallucinations could not altogether be satisfactorily demonstrated.

CASE 6. An Italian, also resembles the others. His ideas included those of poisoning; at one time he purchased a revolver for protection.

It will thus be seen that in their symptoms and reactions these four patients were very similar; visual hallucinations were probably present, with or without illusions, or falsifications of memory, or auditory hallucinations. The reactions were not unlike those seen in alcoholism, but a history of alcoholism was not obtained. It may be more than a coincidence that three of the four patients were Italians. Two of the patients showed diminished knee jerks, one with symptoms of ataxia. The alcoholic incidence of the group was: excessive, no patients; moderate, three patients (75 per cent.); occasional, one patient (25 per cent.). These histories, I believe, are reliable.

*Subgroup b (Maniacal, Manic Depressive Type)*

(b) In this group were six visual hallucinatory patients, who differed in several important respects from the group just described. It seems desirable to describe these patients.

CASE 7. L. J., Hebrew, aged 41, was admitted to the Philadelphia Hospital for the Insane, March 29, 1916. His illness began two years before his admission to the hospital, with depression on account of the death of his child. Later he showed lack of judgment and grandiose ideas; he squandered money on foolish business enterprises. It was on account of his demented acts that he was sent to the hospital. On admission to the hospital he was complacent enough, though he admitted that he was "nervous." He had numerous delusions of grandeur. In October, 1916, he became very much depressed. He insisted that little red devils, whose appearance he described, pursued him. From this time on, until his death, the patient remained depressed, although delusions of grandeur were always present. After a number of attempts at suicide the patient cut the radial artery and ulnar nerve of his right hand—to get rid of the little red devils. In October, 1917, he showed pseudo-reminiscences; he also stated it was Germans and not red devils who had pursued him; his judgment was poorer and he was inclined to falsify. On January 28, 1918, he suddenly became very excited; apparently he talked to imaginary persons or objects. He died the next day of exhaustion. He had used alcohol occasionally. A few weeks before his admission, his family believed he was drugged, or else that he had been drinking. This was their explanation for his symptoms, but the evidence in favor of this was unreliable. It will be noticed that hallucinations appeared several months after his admission to the hospital.

CASE 8. J. M., of Irish descent, aged forty-seven, was admitted to the Philadelphia Hospital for the Insane, September 19, 1917. One sister was out of her mind for a time, and her trouble was said to be due to alcoholism. His illness started eight years before his admission to the hospital, and was pronounced locomotor ataxia. A year after the onset of his illness he became irritable; at times he was apathetic, at other times happy. Delusions of grandeur did not appear until admission to the hospital, they were never very pronounced. It was necessary to send the patient to the hospital on account of demented and unmanageable acts. He was subject to frequent epileptiform convulsions. He was frequently restless, confused and irrelevant. On December 28, 1917, or more than three months after his admission to the hospital, the patient was given a dram of paraldehyde on account of restlessness. About half an hour later he became very apprehensive because animals (domestic) were about his bed. It was thought at the time that paraldehyde might have been the cause of his hallucinations; but on subsequent occasions he had similar attacks without the administration of any drug. On these occasions he complained about snakes. This patient

had used alcohol to excess. He had webbed fingers. He died after a convulsion.

CASE 9. H. D., aged 36, married 13 years, was admitted to the Philadelphia Hospital for the Insane, July 26, 1916. His wife states that he was always mean and quarrelsome. Five years before his admission to the hospital some of his acts were suspiciously grandiose. Two years before admission he became very irritable and had attacks of melancholy. Three months before admission he became very restless, exhibited numerous delusions of grandeur, saw animals around him and heard voices calling him. On admission to the hospital a differential diagnosis between manic-depressive insanity, and paresis was somewhat difficult. He has had attacks of depression and elation, both with grandiosity. On admission to the hospital he blamed a policeman for his confinement, now he bitterly blames his wife. He had not shown any hallucinations. He was a hard drinker; and a sexual pervert. While in the navy he had visited many parts of the world; he could speak several languages, had read extensively, including books on philosophy and religion; his manner of speech was rather brilliant when he was admitted.

CASE 10. P. B., aged 55, was admitted to the Philadelphia Hospital for the Insane, August 16, 1916. His illness was of two years duration; he was sent to the hospital for care. On admission he was talkative, irrelevant, and happy. He often laughed over his own ludicrous statements, which consisted partly of fabrications. He saw snakes and toads, but did not mind them. He died after a convulsion.<sup>8</sup> He had not used alcohol for ten years, according to his wife.

Closely related to the above four patients are the following two patients:

CASE 11. M. M., aged 32, was admitted to the Philadelphia Hospital for the Insane, December 15, 1915, on account of demented acts. His mental characteristics have remained the same since admission. He showed, even on admission, a certain amount of dementia, mingled with excitement, incoherence, grandiosity, exaltation, and a certain amount of suspicion. Delusions of poisoning, refusal of medicine, visual hallucinations of animals, and probably auditory hallucinations have almost constantly been present. He used alcohol occasionally.

CASE 12. J. G., aged 37, was admitted to the Philadelphia Hospital for the Insane, December 28, 1915. This patient had been a college student; had always been of jolly disposition, was a good sport, cared more for sports than study, and had been a heavy drinker for many years. One of his brothers is considered to be mentally below normal, one of his children is a cretin. His illness began five years before admission with a well-marked attack of depression, during which time he said people talked about him. Later he became grandiose in his manner and actions, and had to be sent to the hospital, where his mental characteristics have remained constant. He is more often excited than

<sup>8</sup> Grossly his brain at autopsy was paretic. Microscopic sections have not been completed at the time of writing of this paper.



not; he is incoherent; he often coins words or talks meaningless phrases. He also shows euphoria, grandiosity, fabrications, hostility, suspicion, vague ideas of persecution, of poisoning, refuses food; he is practically never happy. He has had visual and auditory hallucinations, chiefly visual, but never of animals. His knee reflexes are exaggerated.

The mechanism of the production of visual hallucinations in these six patients may not have been the same, nevertheless they seem to have certain characteristics in common. They were all admitted on account of grandiose or demented acts, or both; and hallucinations appears some time after admission to the hospital (with one well-marked exception); of three who were of the hypomaniacal or chronic maniacal type, one was happy, two were of the delusional type. Of the other three, one was continually depressed, one was subject to attacks of restlessness, and one was of the acute maniacal type. Delusions of grandeur were present in all, and well marked in five. Two of the six were of an abnormal, maniacal make-up. Five of the six saw animals. Finally five of the six showed absent knee jerks and well-marked signs of ataxia. While the incidence of absent knee jerks has been high even in some of the non-hallucinatory groups, it is highest in this group, and seems to be attributable neither to coincidence nor to alcoholism. Two patients had negative eye grounds, the other were not examined. The alcohol incidence in the group is high: just as it was in the non-hallucinatory maniacal group.

(In connection with absent knee jerks it might be mentioned that seven blind patients, all but one of whom are dead, showed the following: four blind paretics, two with absent knee jerks, two with exaggerated knee jerks; two with eye grounds not examined, one with primary optic atrophy, one with retino-choroiditis; one alcoholic history not obtained, one an abstainer, one a moderate user of alcohol and one an occasional, gave no history of hallucinations and showed none during the disease. Three cases regarded as cerebrospinal syphilis, one with no eye ground examination, one with primary optic atrophy, one with papilledema (no tumor at autopsy); all with absent knee jerks; one alcoholic history not obtainable; one a moderate user of alcohol, one a total abstainer; showed visual hallucinations probably in one case.) Before leaving the subject of visual hallucinations two additional cases will be quoted.

*Subgroup c (Alcoholic Hallucinatory Paretic)*

CASE 13. G. H., age 47, admitted to the Philadelphia Hospital for the Insane, July 2, 1915. The onset was with nervousness, forgetful-

ness, grandiosity. In the hospital he was elated, then indifferent and demented. Delusions were not conspicuous. He had used alcohol excessively; knee jerks were diminished. When first admitted he imagined a hatchet was arranged on a pulley to kill him; he possibly heard voices. This case illustrates hallucinations probably directly depending on alcohol.

CASE 14. This case illustrates very interesting visual hallucinations (induced or hypnagogic hallucinations) for a man who was considered to be a paretic. Unfortunately there are no post-mortem findings. The patient was a moderate user of alcohol; the onset of his disease was with physical symptoms, including speech defect; also undue optimism. The clinical course was one of gradually increasing dementia, and at one time grandiose ideas. Knee jerks were exaggerated. At one time the patient stated that at night, by closing his eyes, he was able to see women. They were of ordinary appearance and size; strangers to him. The moment he opened his eyes they disappeared. The patient stated that he knew that there was no one in front of him, that the women were a product of his imagination. At the same time, he had auditory hallucinations, which he did not recognize as such. At night he was called vile names; one patient called him a Russian Jew. As a matter of fact, the other patients in the room were entirely too demented to have so characterized this patient.

### GROUP III. AUDITORY HALLUCINATIONS

This comprises the patients who had auditory hallucinations.

#### *Subgroup a (Delusional with Depression)*

This group includes five patients who are comparable to that group with visual hallucinations who had delusions of persecution before their admission to the hospital and who reacted to their delusions and hallucinations. Three of the patients had unobtrusive delusions of grandeur; three were depressed throughout the course of the illness, one markedly so. Three of the patients were colored, whereas in the similar group with visual hallucinations three of the patients were Italians.

CASE 15. W. R., colored, aged 38, married, was admitted to the Philadelphia Hospital for the Insane February 9, 1917. He had always been a steady worker. Six months before admission to the hospital he said people talked about him; wanted to harm his wife, and put bad smells in his house. A crowd of youngsters were talking about him, he thought. On admission he was excited and noisy; he then became quiet, and was often depressed, never exalted, though at times he talked vaguely in millions. He was somewhat confused for recent events, but later cleared up, leaving, of course, a residuum of dementia. During the period of confusion he had unpleasant peculiar hallucinations and illusions of memory, and was himself puzzled and worried to know

whether they represented facts or dreams. He often inclined his head to listen, at which time he heard people talking about him; at other times people repeated what he said. He refused food at times because he said it was poisoned and made him feel nauseated. He had used alcohol moderately. He died December 28, 1917, in a confused, restless state, some weeks after convulsions.

CASE 16. J. M., aged 35, was admitted to the Philadelphia Hospital for the Insane August 17, 1917. Onset was with ideas of persecution. He was afraid of an imaginary enemy and stayed awake one night to watch for some one. People talked about harming his wife; he smelled chloroform. On admission he was slightly depressed, and still retained his ideas to a certain extent, but soon became more demented, at times mildly exalted and grandiose. He had been an alcoholic abstainer.

CASE 17. R. B., colored, aged 38, was admitted to the Philadelphia Hospital for the Insane August 30, 1916. The onset was with depression and hypochondriacal ideas. A short time before admission he thought the police were outside of his house waiting for him. In the wards he was much depressed. He claimed he was called names. He had no delusions of grandeur. He died after convulsions, January 23, 1917. He had used alcohol occasionally.

CASE 18. J. H. J., aged 21, colored, a juvenile paretic, was admitted to the Philadelphia Hospital for the Insane November 4, 1917. As far as his relatives know, the onset of his illness was chiefly with symptoms of dementia. On two occasions he insisted, during the night, on searching the house with his father for the origin of a voice that was saying vile things about him. In the ward he has shown ideas of grandeur, and mild ideas of persecution. He possibly talks to imaginary people. He has a muscle habit. He used alcohol moderately.

### *Subgroup b (Maniacal, Manic Depressive Type)*

This group includes three patients, two of whom are comparable to the maniacal group with visual hallucinations. The term maniacal is not used here synonymously with excitement. The hallucinations developed after admission to the hospital. The patients were not admitted on account of persecutory delusional ideas. The hallucinations were active.

CASE 19. J. M., aged 38, was admitted to the Philadelphia Hospital for the Insane September 22, 1916. The onset was with change of character, and demented acts. In the hospital he was usually very grandiose, often excited and restless. In June of 1917 he began to hear scolding voices at night, and hunted the origin of the voices. Later he became depressed and refused food. He died October 22, 1917. He had used alcohol moderately.

CASE 20. A. S., aged 42, was admitted to the Philadelphia Hospital for the Insane October 16, 1916. He was brought to the hospital on account of demented behavior. He showed fabrications, delusions of

grandeur, maniacal excitement and talkativeness. He has often been noticed talking to imaginary people, whom he located vaguely in the ceiling, and has stated they talk to him. At one time he said he saw snakes, horses, cows, and mules. He had used alcohol occasionally.

CASE 21. J. K., aged 36, was admitted to the Philadelphia Hospital for the Insane July 30, 1917. One brother has dementia præcox. The patient had been of a jolly disposition, quick tempered; did not get along well with his wife. The onset of his illness was with change of character and then sudden excitement. In the ward he has shown incoherency, flight of ideas, grandiosity, active auditory and possibly visual hallucinations. He had used alcohol moderately.

#### *Subgroup c (Non-Classified)*

This group includes two patients with auditory hallucinations who were not easily classified in the other groups. One patient, aged 34, colored, admitted on account of dementia, of defective make-up, had had vague delusions of persecution and hypochondriacal complaints. The patient was always quiet but had vague persecutory ideas. On one occasion he heard women's voices from a voice box. Also an electric light was hurting his eyes, and drawing his knees. He died of convulsions September 18, 1917. He had used alcohol moderately, his knee jerks were exaggerated. Another patient, who alternated between elation and depression, for a period heard the voice of a woman. He would incline his head to listen to her. He had used alcohol moderately; his knee jerks were exaggerated.

Finally there were a small number of patients, with hallucinations, usually auditory, which were not connected with any episodes or any particular symptoms.

### DISCUSSION

#### *Number of Patients in Each Group*

In the last three years there have been admitted to the Philadelphia Hospital for the Insane, in round numbers, each year sixty male paretics, and three hundred and sixty-five male patients. Eighty-five per cent. of the paretics were admitted to my wards, the remaining fifteen per cent. on account of excitement or for some other reason, were admitted to other wards. Of the three hundred and sixty-five, let us say in sixty-five (including paranoia, senile dementia, and imbecility) the diagnosis of paresis would not be in question, and that the remaining two hundred and forty (sixty paretics deducted) constitute a group in which a negative failure in diagnosis, that is, the failure to recognize paresis when it was

present, is possible. If we put the error in this group as two per cent., then in forty-eight patients, or in three years, one hundred and forty-four patients, the diagnosis of paresis might have been overlooked. Added to this there would be twenty-seven paretics, or the fifteen per cent. not admitted to my wards, in three years, a total of one hundred and seventy-one possible paretics. Of these about one half, or eighty-five patients, would have been available for study. Now inasmuch as most of the hallucinations occur in aberrant types of paretics, and since the usual types are admitted to my wards, let us suppose that eighty-five cases of aberrant paresis have been overlooked, and that they all would have had hallucinations. Certainly the figures are liberal enough. With the twenty-five cases of observed hallucinations we would have one hundred and ten cases of hallucinations, including persecutory delusional, maniacal, depressed, and other groups. There would remain, nevertheless, forty or fifty cases of non-hallucinatory paretics. Whatever the cause, it is of significance that one group of paretics is marked off from the other not only by hallucinations, but by a distinct symptomatology; for hallucinations do not occur hap-hazard in paresis, but very often in distinct combination with other symptoms. Excitement in itself is not a distinctive symptom of any group of paretics. Quite a number of patients in the non-hallucinatory group at one time or another were restless or excited after the manner of paretics, and not a few made their exit in this way, but this excitement as such was seldom accompanied by hallucinations. On the other hand, certain trends, such as a maniacal or delusional, were found to characterize certain patients not only in the beginning of the disease, but for a long time thereafter; so that if such a patient were examined one or even two years after admission to the hospital he still showed the same characteristics. It is this difference in the symptomatology of hallucinatory and non-hallucinatory paretics which offers a basis for comparison with regards to the various factors which might underlie the hallucinations.

It must be admitted, on the one hand, that the grouping of my patients is somewhat arbitrary; and on the other, that the ground has not been entirely covered. For example, a certain number of paretics, in the beginning of their illness, and for some time thereafter, are apt, on being questioned, to be talkative in a sort of brilliant though rambling manner. Some of these are good-natured, others suspicious or delusional. Perhaps they become subjects of the so-called maniacal or delusional groups. But as stated above,

the basis of my classification has been the characteristics of the patients, not at any one time, but throughout the course of the entire illness.

### ALCOHOLISM

The figures obtained may be seen by reference to the table. The number of patients in each group is small; an error in the alcoholic history of one or two patients in a subgroup would alter the figures perceptibly, nevertheless certain impressions may be gained. In the five groups of non-hallucinatory patients, the exalted fabricatory are perhaps the lowest in alcoholism, with 13 per cent. excessive, and 40 per cent. each of moderate drinkers and total abstainers. The non-delusional patients are next, with 25 per cent. excessive, 50 per cent. occasional and 16 per cent. moderate drinkers. Next are the depressed and grandiose patients. In the depressed there are 33 per cent. excessive, 33 per cent. moderate, and 22 per cent. occasional drinkers; in the grandiose 36 per cent. excessive, 27 per cent. moderate, and 27 per cent. occasional drinkers—about even figures for these two groups. The highest in excessive alcoholism, not only among the non-hallucinatory patients, but in all the groups, is the maniacal group, with 60 to 80 per cent. excessive alcoholics. Possibly this last group is to be regarded as potentially hallucinatory. In the hallucinatory groups the alcoholic figures compare not at all unfavorably with the figures just given. Of the patients with visual hallucinations, the delusional group with reaction to environment showed no excessive drinkers, and seventy-five per cent. moderate drinkers. Of the patients with auditory hallucinations, the delusional with reaction to environment showed 20 per cent. excessive and 60 per cent. moderate drinkers. The visual maniacal showed a high percentage—50 per cent. of excessive drinkers; a discrepancy is introduced in the auditory maniacal, who showed no excessive drinkers,—but all (100 per cent.) moderate.

In the visual maniacal patients it may be tempting to ascribe the hallucinations to alcohol; but both in time and space these patients were often far removed from alcohol when their hallucinations were manifested.

One gains the impression, therefore, that the hallucinatory groups do not have more alcoholic patients than the non-hallucinatory, but that in each group there are certain subgroups of similar patients who furnish a high percentage of alcoholism.

This in itself is not necessarily an argument against alcoholism as a factor in the hallucinations since all alcoholics do not necessarily



TABLE SHOWING NUMBER OF PATIENTS IN EACH GROUP, WITH THE PERCENTAGES OF ALCOHOLISM, ABSENT KNEE JERKS, AND PREVIOUS MAKE-UP OF THE PATIENTS.

	Symptoms (Subgroup)	Number of Patients in Each Subgroup	Percentage of Alcoholism				Percentage Absent Knee Jerks, With or Without Various Signs of Ataxia	Percentage Abnormal Make-up	
			Excess	Moderate	Occasional	Total Abstainer		Defective	Abnormal
Group I. No hallucinations	A. Non-delusional .	12	25.0	16.6	50.0	8.3	*58.3	8.3	8.3
	B. Depressed (chiefly non-delusional).	9	33.3	33.3	22.2	11.1	22.2	0	11.1
	C. Grandiose (exalted) . . . . .	11	36.3	27.2	27.2	9.0	27.2	9.0	9.0
	D. Maniacal (maniac depressive type) . . . . .	5	*60-80	20.0	0	0	*40.0	0	60.0*
	E. Fabricatory (exalted with pseudo-hallucinations) . .	15	13.3	40.0	6.6	40.0	*46.0	6.6	6.6-20.0*
	Total . . . . .	52							
Group II. Visual hallucinations	A. Delusional (with depression) . . . . .	4		75	25	0	*50.0	0-25	0
	B. Maniacal (maniac depressive type) . .	6	*50	0	33.3	16.6	*83.3	0	33.3*
	C. Alcoholic hallucinatory . . . . .	1	*100	0	0	0	*100	0	0
	Total . . . . .	11							
	Percentage visual hallucinations . . .	15							
Group III. Auditory Hallucinations	A. Delusional (with depression) . . . . .	5	20	60	0	20	20	0	0
	B. Maniacal (maniac depressive type) . .	3	0	100	0	0	0	0	33.3*
	C. Unclassified . . . .	2	0	100	0	0	0	0	0
	Total . . . . .	10							
	Percentage auditory hallucinations . . .	13.6							
Grand total . . . . .		73							

The title of the subgroups corresponds to the description in the text, and not to the usual designation of paretics. Thus patients in the "maniacal," and the "delusional with depression" groups were "excited paretics." High percentages are marked with an asterisk. It will be seen that among 52 non-hallucinatory patients, five were "maniacal," whereas as among twenty-one hallucinatory patients, more than one third, or 9 were "maniacal." It has been explained in the text that some "maniacal" hallucinatory patients do not reach my wards, so that the number of environment, called "delusional with depression," fall into the hallucinatory groups. The table seems to show, therefore, that patients with hallucinations are apt to show different symptoms than those without hallucinations. Pseudo-hallucinations (fabrications) must not be mistaken for hallucinations.

have to have hallucinations. Without reference to types of patients, of the excessive users of alcohol, sixteen were without hallucinations, five with; of the moderate, fifteen were without hallucinations, eleven with; of the occasional, twelve were without hallucinations, three with. Of the alleged abstainers, nine were without hallucinations, eight with. If one assumes that the histories of abstinence are incorrect, and that the word "moderate" should read "excessive," one might find an argument for a relation between alcoholism and hallucinations. Assuming the figures as correct, it seems to me that it is difficult to draw conclusions.

Do alcoholic paretics furnish any particular group of symptoms? Here we do not know what percentage of insane patients or paretics may be alcoholic without altering their usual symptoms. Twenty-five per cent. excessive and 50 per cent. occasional alcoholism in the non-delusional paretic, as opposed to thirty-six per cent. excessive and twenty-seven per cent. occasional alcoholism in the grandiose paretic, may lead one to believe that the grandiose paretic drinks a little more than the non-delusional paretic, but it does not prove that it is the cause of the former's grandiosity. The same argument applies to the maniacal or any other group.

Previous personality of the patient.

The subgroups of patients of the grandiose, fabricatory, and in some instances the maniacal patients furnish the most florid paretics met with. It has already been stated that the simple grandiose and fabricatory patients (using these terms to denote symptoms above described) are not prone to hallucinations, though the maniacal are. In eleven paretics of abnormal make-up, Osnato<sup>3</sup> found two with hallucinations. The maniacal groups of my patients contains the largest number of patients who were abnormal before they acquired paresis. Taking my figures as they are, it is seen that if an equal number of non-hallucinatory and hallucinatory patients are compared, that the latter contains a much larger number of patients of abnormal make-up; that is, patients who were in some way peculiar before they acquired paresis. The previous personality, in itself, however, will not account for the hallucinations in paresis.

*Knee jerks.*<sup>9</sup> This includes diminished or absent knee jerks, with or without signs of ataxia, but usually with. The lowest figure for diminished or absent knee jerks occurred in the depressed group—22.2 per cent. The fabricatory, maniacal, non-delusional, and delusional visual showed 46.6, 40.0, 58.3, and 50.0 per cent. respectively. The maniacal visual showed 83.3 per cent. Some of

<sup>9</sup> This refers to the knee jerk after the patient has been under observation. Not infrequently, after several months or more, the knee jerk changes.

these groups were low, others high, in alcoholic percentages. The absent knee jerks in the last named group were probably more than a coincidence.

*Percentages of hallucinations.* The total number of patients studied were seventy-three. Visual and auditory hallucinations occurred about equally. There were eleven instances of visual hallucinations, or 15 per cent.; and ten instances of auditory hallucinations, or 13.6 per cent. These figures may perhaps be low, the reason for this has been explained.

*Meningeal reaction.* In a number of instances spinal fluid cell counts were performed several times in the same patient, as, for example, before and during excitement. No conclusions could be drawn. Such a study would have to be very carefully made, inasmuch as the cell count in paresis may vary even from day to day, or in different collections of the same puncture.

The anatomical theory of hallucinations in paresis. In order to explain the hallucinations on an anatomical basis (if it is assumed that all paretic hallucinations have this basis) one might postulate differing anatomical processes (initiation and destruction) in the two groups of cases (hallucinatory and non-hallucinatory) and *different* localization of these two symptomatically opposed processes in the two groups. In paretic brains showing gross changes Southard mentions euphoria, expansiveness, exaltation, confusion and incoherence, as the chief symptoms; in brains without gross changes the chief symptoms were allopsychic delusions, sicchasia, résistiveness, destructiveness, and violence; but hallucinations are mentioned in a fair proportion of cases of both groups.

#### CONCLUSIONS

1. In a study of seventy-three paretics, the patients were found to fall into several clinical groups, which tended to remain fairly distinct.
2. Hallucinations were found to occur in certain of these groups, and tended to remain confined to these groups.
3. Excessive alcoholism occurred in only some of the hallucinatory groups, and was at most an indirect factor in the production of the hallucinations.
4. Florid paretics showed a conspicuous absence of hallucinations.
5. Certain manic types showed hallucinations, and a high incidence of excess of alcohol use, abnormal makeup, and absent knee jerks; but other hallucinatory patients did not show this combination.

## Society Proceedings

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### NEW YORK NEUROLOGICAL SOCIETY

THE THREE HUNDRED AND SIXTY-SEVENTH REGULAR MEETING,  
HELD AT THE ACADEMY OF MEDICINE, NOVEMBER 12, 1918

The President, DR. FREDERICK TILNEY, in the Chair

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#### THALAMIC SYNDROME

Dr. Joseph Byrne presented a case illustrating the thalamic syndrome and demonstrated all the clinical evidence of this diagnosis. The case was shown primarily on account of the extraordinary sensory findings. Dr. Byrne prefaced his remarks by stating that, although he had studied over ten cases of this syndrome, the nearest he got to pathological material was at an operation. The patient was fifty-six years of age; eighteen years ago in the middle of the day she had a stroke of apoplexy, falling to the floor and being unable to rise. There was no loss of consciousness, but she could not speak for three years (motor aphasia), though she understood everything that was said to her. She had right homonymous hemianopsia. There was no recurrence of the attack and no convulsions. General physical examination showed normal urine; Wassermann, spinal fluid and blood, negative. Blood pressure was 115/80. The neurological examination on the motor side showed a typical right hemiplegia. The reflexes showed the usual signs accompanying spasticity. The general sensory examination was the one to which the speaker wished to draw attention. *Spontaneous phenomena*: pains were not a feature except under certain circumstances. For instance, when testing her after a certain amount of excitation the limbs began to move, the right leg was pulled up and down at the hip joint and at the same time the patient complained of pain all over the right side of the body, especially in the foot and about the neck. On questioning, the patient was unable to give any quality to the pain. It was not pain in the ordinary sense, but a sense of extreme discomfort which caused inexplicable anguish. Such a paroxysm might last anywhere from a few moments to half an hour, when it quieted down again. Emotional stimuli seemed also to be capable at times of exciting both movement and pain. Dr. Byrne expected later to elaborate the mechanism of these movements and pains. *Elicited phenomena*: There was

complete absence of sensibility for all forms of stimulation with the exception of gross affective stimuli over the right half of the body and limbs, with the exception of the mesial aspect of the face and neck. Such affective stimuli as were felt were perceived only as a sense of extreme discomfort. On the mesial aspect of the face the dissociation of sensibility took on quite a different aspect. Sensibility was absent for superficial cortical stimuli, while for superficial affective stimuli sensibility was preserved with over-reaction, wide radiation, poor localization and inability to name the nature of the stimulus. The interesting features here were the two different types of dissociated sensibility. As perceived by Dr. Byrne, the obvious inference from these findings was that in their peripheral distribution the sensory system of nerves consisted of the following sets: (1) superficial critical, (2) superficial affective, (3) deep critical, and (4) deep affective. This subdivision of the peripheral nerves was more practical, at least from the clinical standpoint, than Head's division into epicritic, protopathic and deep sensibility. These terms had been most puzzling, not only to students, but to teachers, and there was a question whether many of those using them really understood what they meant. The division made by Sherrington into exteroceptive, enteroceptive and proprioceptive might have a certain use in the study of anatomy, but from the clinical standpoint were not of much service.

The case further showed that in the thalamus lay the means of segmental sensory representation as manifested by the sensory findings over the mesial part of the face and neck, in addition to the segmental distribution observed in disease of the posterior root ganglia (herpes zoster) and in visceral disease. Another point of interest was the question of the nature of the fifth cranial nerve, i. e., whether it was a splanchnic or somatic nerve. Judging by the kind of musculature supplied by the fifth nerve, namely, the muscles of mastication, the fifth nerve was regarded by many authorities as being splanchnic in nature, since these muscles were derived from the first gill arch, the gills being viscera, whereas the musculature supplied by somatic nerves proper were all derived from the paraxial mesoderm. As to the mechanism, these two forms of dissociated sensibility could be readily understood from a study of a diagram exhibited by Dr. Byrne which showed the relation between the critical and affective paths in the thalamus. The question of consciousness was too big for discussion at this time, but Head and Holmes believed that the cerebral cortex exerted inhibitory controlling power on the essential organ of the thalamus, and in this way prevented over-reaction, radiation, etc., which occur in the characteristic dysesthesia of the thalamic syndrome. There were reasons for doubting the validity of Head and Holmes' views on this point; instead the view might be suggested that in the thalamus either the main stems or collaterals of the critical pathways reached the so-called essential

organ and then exerted inhibitory control, and in support of this view one could instance the simple spinal reflexes in which the afferent impulses not only excited one set of muscles to activity in a spinal animal, but inhibited their antagonists. The control of the lower nociceptive reflexes, the lower protective mechanisms, which by the way were primarily activated by affective stimuli, was the first step in the interests of the higher mechanisms of defense, escape, etc.

*Discussion.*—Dr. H. Climenko was interested in these disturbances. He had studied a number of these cases and found that if tested with moist heat at the same temperature as the test tube the patient would recognize the sensation through the fluid much sooner.

Dr. Byrne had spoken of threshold sensation; did he mean the acuity of the stimulus or the size of the area affected? One might get the same reaction when a large or small area was affected, with a strong stimulus. It would seem that Dr. Byrne's deductions could only be made when one studied a pure thalamic syndrome and this case presented evidence of association with hemiplegia.

Dr. Smith Ely Jelliffe said that he had enjoyed Dr. Byrne's presentation very much, but he wondered if he had pathological evidence to support him in elaborating these hypothetical pathways as outlined in his diagram. Secondly, in what sense would he differentiate the affective sensibility from ordinary vegetative arc reflexes? It seemed to the speaker that Head's protopathic sensibility might better be discussed from the vegetative side. Dr. Byrne's suggestions were very interesting because he was following distinctly the phylogenetic point of view and trying to keep the sensorimotor and vegetative series apart, and at the same time synthesize them in this sketch he had given of the thalamus.

Dr. Frederick Tilney thought Dr. Byrne's suggestions were exceptionally good so far as they concerned this new presentation of sensory differentiation. He did not believe one could hold very strongly to Head's distinction of epicritic and protopathic sensibility. As a matter of fact, most of his own followers had put these terms in quotation marks and attempted to give an explanation of what he meant by them. The speaker believed that every type of somesthetic sensation had an affective pathway by means of which a defense mechanism was provided to protect the tissues. As to whether these hypothetic pathways in Dr. Byrne's diagram were correct, Dr. Tilney felt that they hardly met the conditions. Phylogenetically, the hypothalamus was an archaic structure, while the thalamus proper was a more recent addition. The affective side could much rather be said to belong to the older system, and it was probable that the path for the affective neurons would be found terminating in the hypothalamus and secondarily receiving control of the cerebral cortex. The speaker agreed with Dr. Jelliffe and Dr. Climenko that one should be careful in the designation, for this case



presented definitely capsular symptoms and therefore other fibers might have been compromised.

Dr. Byrne, in replying to Dr. Climenko's comment, reminded him that moisture was a physical condition which influenced conductivity at the point of contact of the stimulus. This was somewhat similar to the effect of the increased activity of the sweat glands in the psychogalvanic test. As regarded the point that this was not a pure thalamic syndrome case, but one associated hemiplegia that was true, but the internal capsule was in very close relation with the thalamus on its ventro-lateral aspect where the sensory pathways passed toward the cortex. The thalamus was a large and important organ and not every lesion of the thalamus constituted the thalamic syndrome. Regarding the size of the area stimulated, these things were all taken into consideration and it was not the size of the area, when testing with gross affective stimuli such as heat and cold, that counted so much as the bulk of the fluid employed and the time during which the stimulus had to be kept in contact with the skin. Replying to Dr. Jelliffe's question in Head and Holmes' series of twenty-seven cases there was only one autopsy and in this, done by Holmes, the lesion was not confined to the thalamus proper by any means. Dr. Byrne had already mentioned that he had not had the opportunity of obtaining pathological material, though he had studied more than ten cases which were identical in sensory distribution with the one reported here. In one of these cases, however, operation was performed by Alfred S. Taylor, and a clot and a collection of serum were found in the vicinity of the internal capsule. In regard to Dr. Jelliffe's point about the vegetative arc reflexes, it is well known, of course, that Ranson had shown that in the peripheral nerves unmyelinated fibers existed to a degree that had been hitherto unguessed and these fibers mediated the protopathic sensibility of Head which was equivalent to the affective sensibility discussed in this case. Compare the modern view of the mechanism of tonus in skeletal muscle in which the tonic element or gel condition was the result of impulses passing along sympathetic fibers which could be traced to the anisotropic disc, i. e., far beyond the limits of the ordinary end plate. In reply to Dr. Tilney, the affective pathway was *par excellence* the one concerned in all the lower protective mechanisms, but once the thalamus was reached the protective mechanisms took on a different aspect and now, instead of withdrawal, other means of defense were invoked through cortical intervention, namely, judgment, memory, etc. Compare the projicient receptor mechanisms, e. g., those of sight and hearing, which with the aid of locomotion enabled an animal to avoid injury without coming into actual contact with the noxious object. The term thalamus included in its broad sense not only the hypo, but the epithalamus, and the pathways in the diagram here presented were not intended to be taken as representing strict anatomical conditions, but were only a suggestion as to the possible way in which lesions of the

thalamus affected the dissociations of sensibility encountered. It might be that certain of the affective pathways ended in the hypothalamus, but it was also quite certain that the affective pathways concerned in somatic sensibility ended in the thalamus proper.

#### MULTIPLE SCLEROSIS WITH LEVEL SYMPTOMS. RESULTS OF LAMINECTOMY

Dr. Hyman Climenko presented this case: A married woman, an Austrian of Hebrew parentage, 32 years of age, who entered the Montefiore Hospital in July, 1918. Her father died of tuberculosis, a brother is in an insane asylum, and a paternal uncle is suffering from diabetes. The patient had one living child, had had miscarriage, and one child still born. In 1912 she began to complain of numbness and a sensation of pins and needles in the fingers of both hands. Soon she had similar sensations from the waist downward. This was followed by a burning pain in the back of the neck. Shortly afterward she began to experience stiffness of both lower extremities and would frequently stagger and fall. There was difficulty in starting urination, and constipation. Six months after onset of these symptoms patient underwent operation for an ischiorectal abscess, and in January, 1918, another operation was performed for a cervical spinal cord tumor. The findings were negative. Soon after this operation, however, patient felt completely relieved. She was up and about; walked with ease and the sphincteric and sensory disturbances also improved. This continued for a few months, when all her symptoms returned quite suddenly. Her present complaint was great difficulty in walking, girdle sensation, and some difficulty in starting urination. The picture the patient presented in July showed the syndrome of spastic paraplegia. No nystagmus, no changes in the optic discs. There was complete loss of deep sensibility in both feet. There was a belt of hyperesthesia corresponding to the fifth, sixth and seventh dorsal segments on the right side. Right abdominal reflexes were absent; present on left. On October 23, 1918, the same spastic condition was noticed. In addition patient suffered from vesical and rectal incontinence. She complained of pain in both lower extremities. *The line of hyperalgesia was now at the twelfth segment.* The Wassermann of both fluid and serum was negative. Urine negative. Blood pressure 135/85. She had a systolic apical murmur. A point of emphasis was the fact that after presenting for six years a complete picture of an organic paraplegia she practically had *no trophic changes in the affected limbs.*

Some time ago Dr. Abrahamson, at a meeting of this Society, spoke of the "gentle touch" in multiple sclerosis as compared with pressure symptoms due to a cord tumor. Had this patient been suffering from a tumor at the time of the operation, almost six years after onset, she would have presented distinct tropic changes of muscle and skin with

the amount of disability she suffered then. This point had not been sufficiently emphasized in differentiating spinal cord tumors from multiple sclerosis with level symptoms. The changes on the sensory level were also interesting. No doubt at the time of the operation sensory changes corresponding to cervical involvement must have been present, for the incision scar ended at the first dorsal vertebra. A few months later a new level appeared at the fifth and sixth dorsal, and to-day a distinct level at the twelfth dorsal was present. This illustrated that it was not sufficient to make a diagnosis of a level lesion by sensory changes only. The most important point, however, was the result of the operation. Some time ago results of such operations were current. Attempts were made to show that in multiple sclerosis, where level lesions were present, a mere laminectomy was sufficient to cause an improvement in the course of the disease and probably curtail its progress. The case here presented also showed an improvement for months following laminectomy. The symptoms, however, returned. The question arose, was not the improvement following laminectomy a natural remission peculiar to multiple sclerosis, the cause of which was still not understood? The case was of course presented here as one of multiple sclerosis.

*Discussion.*—Dr. Moses Keschner asked if such marked sensory symptoms were common in multiple sclerosis.

Dr. Jelliffe regarded the diagnosis of multiple sclerosis as highly probable. The fact that the syndrome included sensory changes was in no sense to be considered as contradictory. It was very old-fashioned and obsolete to regard multiple sclerosis as accompanied by motor syndromes only. Certain patients with well-marked multiple sclerosis might begin with sensory disturbances. This was largely a matter of accident as to the localization of the sclerotic areas. While it was true from a statistical point of view that motor involvement usually preceded and was more prominent, yet it was not a necessary part of the disease considered clinically or pathologically.

Dr. Jelliffe said that the pathology of this disorder had interested him greatly. Of recent years he had been attempting to make some psychical correlations. The recent studies of Dawson on the vascular changes had helped him a great deal to gain some insight into the nature of the pathological processes and concerning which he had made a statement in his text-book in the chapter on multiple sclerosis. The character of the exudation phenomena, which determined the pathology as well as the symptomatology, had a number of analogues to other types of exudative phenomena which were known to have a strong affective basis as one of the many etiological factors. Within the spinal cord the vegetative balance of vascular control was lost with a localized vascular vagotonia, greatly circumscribed for reasons as yet quite unascertainable. The characteristic replacement tissues then came on and

the chronic phases of the pathological process ensued. Strong affective disturbances then might be conceived as playing an important rôle in multiple sclerosis etiology. They induced the disturbances in the vegetative metabolic reflex arc. The nature of these affects was always hidden in the unconscious. Patients able to get them out in the open and thus capable of conscious observation escaped the possibilities of the inner affective reaction. So that Cannon's observations on hate, anger, fear, etc., while they showed that the hide-bound and orthodox physiologists were discovering a realm in the human machine, known to psychiatrists for centuries, where results could happen from affective reactions which were just as strong and as positive as physical agents, were not yet deep enough and merely lay on the surface. A more penetrating study by means of the concept of the unconscious, as developed by modern psychoanalytic procedures, would undoubtedly show that the so-called exudative diathesis, which concept included a number of the phenomena related to the subject of discussion, had as a real underlying substratum not only somatic, but also psychical characteristics which must be better understood in order to have a dynamic interpretation of the process seen in multiple sclerosis. It should not be forgotten that a multiple or localized erythema of the skin, an exudation in a joint, a serous meningeal exudate, a diarrhea, might all by an essential pathology be related, but occurring in different tissues this underlying pathology might be confused.

Dr. I. Abrahamson felt that he might add something to support Dr. Jelliffe: the pathology of multiple sclerosis in the period of remission was the same as during the progress of the disease. The same changes had been found at autopsy. The same held true of general paresis in remission and exacerbation. With present methods of staining tissues, the explanation of clinical pictures on pathological anatomical grounds was still fragmentary and insufficient. Disease was always disturbed physiology with changes in anatomy occupying a secondary and less important position.

Dr. Climenko agreed with Dr. Jelliffe in that he did not see why there should not be sensory disturbances in multiple sclerosis. He had always thought the so-called remissions found in multiple sclerosis were probably due to an absorption of some exudate forming around the plaque. Dr. Jelliffe's explanation was extremely interesting.

#### A CASE OF PROBABLE WILSON'S TYPE, PROGRESSIVE LENTICULAR DEGENERATION

Dr. S. Philip Goodhart presented a boy fourteen years of age. The case represented the group whose pathology lay within the area comprehending the great central ganglia of the brain. It could not definitely be stated that the boy belonged to the type described originally by Frerichs, later by Gowers and finally definitely classified by Kinnear

Wilson in 1912 as progressive lenticular degeneration. The clinical appearance, however, and development of this case would seem to place its pathology in the corpus striatum and its associations with the other centers of coördinate movement. The record of this case gave a negative family and personal history. The boy's illness began at the age of twelve, with irregular movements and difficult speech, the latter due to the same hypertonia causing the irregular movements of the extremities. The condition had been steadily progressive. Objectively there was practically no diminution of muscle power, no distinct disturbance of coördination, equilibratory or non-equilibratory. There were no pathological reflexes present, no Babinski, no Chaddock, Oppenheim, Gordon or Schaefer. The deep reflexes were not exaggerated and the superficial ones were not modified. There was continuous hypertonicity and choreo-athetoid movement of all four extremities. There was no pyramidal tract involvement. The speech was dysarthric, but not due to supranuclear, pseudobulbar or bulbar cranial nerve defect; there was just the hypertone of facial and lingual musculature. There was no appreciable mental enfeeblement, but the parents stated that there had been a mental change in the nature of deterioration. Without the demonstration of any liver changes, and these were hardly possible during life, one would scarcely venture an unquestionable diagnosis here of Wilson's disease. One could, indeed, hardly go further than to say that the pathology of this case like many others with now familiar motor syndromes lay within the corpus striatum and its immediate associations. The red nucleus, the corpus striatum and the cerebellum were linked together in their associated activity. The finer differentiation of the syndromes and their association with definite pathological areas within this great terrain remained for further observation and studies of just such cases as were represented by this patient.

*Discussion.*—Dr. Jelliffe asked if a radiogram showed any variation of the liver. It seemed to him that the suggestion as to this being a case of Wilson's was plausible. The question of it being one of dystonia musculorum deformans must also be considered. The actual interference of gait and the manner of its performance suggested dystonia. The more extensive syndrome, however, shown here, including choreo-athetotic movements and the other features of Wilson's, made it not improbable that this case belonged in his category. Other tests of hepatic function might throw some light on the differential diagnosis.

Dr. Abrahamson said that all the diseases situated in that area showed similarity in the clinical syndromes. Double athetosis, Parkinson, the dystonias and Wilson's disease, etc., all probably had similar disturbances of function. If this was a Wilson's the future would show it. A clinical diagnosis was alone possible in these cases. There was the same localization in the brain and the nature of the pathological processes behind the symptoms was the chief factor. Formerly this boy

might have been called a Westphal's pseudosclerosis or any one of the whole series of patronymics attached to lesions occurring in this portion of the brain. As far as the question of this being dystonia was concerned, as suggested by Dr. Jelliffe, when Oppenheim showed his first cases of dystonia Ziehen said, "Those are my cases of double athetosis." This boy's mental state had degenerated very markedly within two years. Dr. Goodhart was correct in calling this a disease of the globus pallidus and leaving its nature to be determined later.

### A CASE OF FRIEDREICH'S HEREDITARY ATAXIA

Dr. Goodhart presented this case also. He said that Friedreich described the disease in 1861 as one of a chronic degenerative wasting of the posterior columns of the cord with the conspicuous clinical features of incoördination, first of the lower and then of the upper limbs, the organs of speech being later involved. Since then many similar cases had been described and the clinical features with the morbid anatomy have been developed. Pathologically these conditions were recognized as a sclerosis of the cord with overgrowth of neuroglia and secondary destruction of the nerve elements in the postero-internal, postero-external, of the dorsal and ventral cerebellar and pyramidal tracts, destruction of the cells of Clark's column, and in some cases apparent atrophy of the cerebellum.

The disease is essentially a familiar one, though not hereditary. As in this case before us, it was frequently found in several members of the same family. The disease was essentially one of early life, having its inception as early as the second to as late as the twenty-fourth or twenty-fifth year of life, in the great majority of cases, however, beginning between the eighth and fourteenth years. A neuropathic family history was common: syphilis seemed to play no etiological rôle. The earliest symptom was usually ataxia of the cerebellar type beginning in the lower extremities. The gait was peculiar, not definitely cerebellar, and less of that type when the posterior columns are involved. In some cases there was vertigo; nystagmus was not uncommon. A group of cases was described by Marie who claimed a definite pathology for his cases that, so far as most observers could see, were essentially the same as those of Friedreich's. The case here presented in some respects suggested those originally described by Marie in that there was involvement of anatomically higher structures than the cord tracts. One might find gradations from the typical Friedreich cases with chiefly cord symptoms to the Marie type with largely cerebellar changes. Along with the typical manifestations due to cord changes, one might also find disturbances of speech, nystagmus, ocular palsies, etc.

The case of this young boy presented characters of both, though it might be called a Friedreich. The family history of this boy was relevant to the extent of suggesting the familial element. He had a brother



afflicted with the same disease. The personal history of this patient was that of the usual normal child up to the twelfth year of age. He was now sixteen. He then suffered from diphtheria. Some four weeks following recovery it was noticed that he began to fall to one side, and that his gait was unsteady. Gradually both feet changed in contour; the arches seemingly became more concave and gradually, without pain and with only mechanical discomfort, the present very marked symmetrical deformity developed. The feet now showed very marked osseous deformities quite characteristic of this form of hereditary ataxia. Usually there was only a pronounced form of hyper-extension of the great toe and pes varus. Here, however, there was a deformity suggesting in appearance club foot. The origin of this symmetrical bony deformity was probably analogous to a tropho-neurosis, and was due to a central lesion. The osseous changes of central origin should receive far more attention and offer a wide field for study. The peculiar changes in the bone structures of the feet furnish one of the interesting features of this case. This boy had both cerebellar ataxia, or dys-synergia, and the ataxia due to posterior column involvement. He likewise had facial asymmetry and very pronounced speech disturbance somewhat of the nature of dysarthria. There was ptosis which was variable in intensity. It was difficult anatomically to explain the absence of Achilles phenomenon with the presence of the knee jerk, for if the former was due to posterior column degeneration it was peculiar that the degeneration did not affect the higher level also.

*Discussion.*—Dr. Climenko had seen this patient at Mt. Sinai and saw also his brother, who presented the identical symptoms. The knee jerks were present at that time, but the ankle jerks were absent. He considered this a case of Friedreich's combined sclerosis. It was not necessary for this diagnosis to have the knee jerks absent; Friedreich himself said this depended on how much one or the other set of tracts was involved. If there was a pyramidal tract involvement there were more spastic symptoms; on the other hand, larger involvement of dorsal tracts would give absence of ankle jerks and knee jerks together with marked ataxia. This boy had lost ankle jerks, marked symptoms of spinal ataxia, which became apparent when the eyes were closed, and also well-pronounced symptoms of pyramidal tract involvement. If one also bore in mind that the boy had no cerebellar symptoms, the diagnosis of Friedreich's combined sclerosis was evident.

Dr. Samuel W. Boorstein thought that the deformity of the foot might be improved by braces. By this means the gait would be corrected. All these cases would be improved by proper orthopedic treatment.

Dr. Abrahamson did not consider this the ordinary pes cavus, or foot deformity, one saw in Friedreich's. It was more like a club foot.

Dr. Byrne asked if there were other stigmata, or evidence of irregular development. They had had several of these cases in the Central

Neurological Hospital and they all showed some evidence of malformation such as cryptorchidism, polymastia, etc.

Dr. Goodhart said there was none except the general conformation of the face. The configuration of the face was rather suggestive. There was an asymmetry in the skull and face, an unusual recession of the lower jaw; the eyes were set abnormally close together and the mouth and nose suggested a snout-like contour. There was considerable evidence of involvement of the joint muscle tendon sense.

As regarded the first case, the discussion had covered its possibilities. Dr. Goodhart did not think, however, that this case could be classed among the dystonias, for conspicuously absent was the tortipelvis, the torsion gait, i. e., the rotation of the trunk on the pelvis, which to some extent characterized the cases described by Oppenheim as dystonia. The character, too, of the hypo, hyper and dystonia, and its distribution, especially as it affected now this and now that group of muscles, probably bore only a resemblance to what was seen here. Likewise, the speech of this patient was more of the pseudobulbar type. At the Montefiore Hospital there were types of cases that might be said to constitute a group whose pathology lay somewhere in that interesting area of the brain where were situated the corpus striatum, the thalamus, and their connections with the red nucleus and cerebellum. It would take much study in pathology in the future to definitely classify these types with their clinical syndromes. The one type had its pathology in the globus pallidus, the other in the putamen and caudate; another again involved the thalamus and its afferent or efferent associations. This case was simply offered with a tentative diagnosis of progressive lenticular degeneration.

### A CASE FOR DIAGNOSIS

Dr. I. S. Wechsler presented this case, a girl, 16 years of age. Onset of the condition occurred in 1917, with dizziness, vomiting before breakfast, diffuse headaches, more severe at night, staggering mainly to the right, double vision on looking down from an upper story window and weakness of the face. The whole condition came on fairly quickly and had not become much worse. There was no history of impaired hearing or even tinnitus, except for the past week. There was some possibility that the patient's mentality had been below par. Physical examination. The salient features were: gait somewhat static with tendency to reel to the right, the closure of the eyes showing no difference. There was no Romberg, adiadochokinesis or dysmetria. Slight ataxia in finger to nose test,  $R > L$ . Speech was unaffected. The deep reflexes were lively and equal; all superfcials present. No Babinski or Chaddock, etc. The muscular status was normal, particularly as to tone. There were no sensory changes except for diminished corneal sensation on the right. Of the cranials, the optic showed a beginning double

papilledema, there was paralysis of the right external rectus and left inferior rectus, hypesthesia (cornea). R. fifth, paralysis (peripheral type), R. seventh, normal, R. eighth, there was lateral nystagmus, both directions and vertical nystagmus upward. The Barany showed a probable normal vestibular apparatus. All other cranials were normal. Systemic examination, including a Wassermann, proved negative.

The diagnosis, in view of the involvement of a left pontial third nerve, was rather difficult to make. A pontocerebellar angle neoplasm might be considered, though it was hard to see why the eighth had not been involved. The vomiting and papilledema spoke for increased intracranial pressure. One could not well conceive anatomically of a single lesion, including also the nuclear third. A basilar meningitis, either tubercular or luetic, might account for the picture, but there was a negative Wassermann, and there was no reason to suspect tuberculosis. An intrapontine lesion, particularly in view of the vertical nystagmus, might well explain all the symptoms except the paralysis of the left inferior rectus. It was possible that a polioencephalitis was the cause of all of the symptoms, a choking off by inflammation of the aqueduct of Sylvius, giving an internal hydrocephalus and papilledema, but the whole picture was not altogether in favor of this view. The question of surgical interference came up, but in view of the uncertainty of the diagnosis it would seem advisable to continue this investigation at the present time.

*Discussion.*—Dr. Climenko said one symptom which Marie brought out was the peripheral facial palsy. This patient had a peripheral sixth and seventh; she also had nystagmus, dizziness and papillitis, and there was only one thing missing and that was evidence of involvement of the eighth nerve. A further examination of the eighth, however, might reveal evidence of involvement. In localizing brain tumor or any brain lesion it should be borne in mind that pressure was able to give distal symptoms. In brain lesion which produced pressure, the most important symptom was the initial one and, secondly, the group of symptoms relating to that particular lesion. The other symptoms were of lesser account. In this case, if one subtracted the symptom on the left side the diagnosis would be clear; a lesion posterior to the peripheral seventh and sixth and probably the eighth, and it was safe to make a diagnosis of a lesion in the cerebellar pontile angle, whether a tubercle or not.

Dr. E. D. Friedman did not consider that there was sufficient evidence to justify a diagnosis of cerebellopontine angle tumor. The absence of cochlear and vestibular involvement on that side, the absence of evidence pointing toward more involvement of the stem of the fifth, the bilateral papillitis and the absence of cerebellar signs, made him think this was an intrapontine lesion on the right with possibly a focal hemorrhage in the nuclei higher up. This sometimes occurred some

distance away from the site of the lesion. The vertical nystagmus, too, would speak in favor of an intrapontine lesion; i. e., a lesion of the brain stem.

Dr. Wechsler regarded Doctor Friedman's conclusion as the correct one insofar as the localization of the lesion was concerned. But as to the vertical nystagmus, most authorities seemed to agree that this was pathognomonic of pontile lesions. As to the question of hemorrhage, there was no reason why the patient should have had one. Possibly poliioencephalitis might account for the double lesion.

### CONTRIBUTIONS TO PSYCHOTHERAPEUTIC TECHNIC THROUGH PSYCHOANALYSIS

Dr. Smith Ely Jelliffe read this paper. He expressed the belief that psychopathology and psychotherapy lay no whit behind the great advances made in every department of medicine during the present time. But there had been marked lagging in well-defined knowledge, though this was not strange when the difficulties of approach to the psychical life were considered. The widest technics were demanded, and demanded now, and the greatest refinement of approach to all the practical problems of psychopathology.

A glance would show what had been done, what vantage ground had been reached, that those who had those problems individually before them might take up the work at the point so far attained. Methods of psychotherapy were in evidence far back in human history. Then, with the pride of more exact knowledge, matters of mental illness slipped into hardened grooves. In more recent times the work that centered around the school of Charcot effectively broke through these barriers and let through some ray of understanding and interpretation. It began to be recognized that there were varying grades of a disturbed thinking where two incompatible trends or modes of thought were striving for possession of the individual's behavior and his attitude toward his environment. Attention was then closely and scientifically directed upon these phenomena. Hypnosis, which had been more or less ignorantly practiced, was subjected to a more precise test of its value as a therapeutic agent, and therefore to a clearer self-revelation of its intrinsic nature. By this was first recognized in its therapeutic application the presence of a large portion of mental activity besides the small amount appearing at any time in the limitations of conscious evident activity. It remained for Freud, however, to carry to a more detailed study the conception of hidden mental factors, and as a result he threw a new light upon mental problems and upon which he based therapy. It was in brief to the effect that affect and idea had been, under social ban, driven from the conscious memory of the individual. Affect, being the indication of a vital dynamic force, could not successfully be kept under repression; it might seem to remain so; it might find some useful sub-

stitute and thus afford a wholesome path for energy transformation and escape. But sometimes affect was separated from its original associated idea and came forth as a somatic disturbance, or an obsession, or a compulsion, or any one of a multitude of phobias arose. Therapy in these cases was better accomplished through conscious coöperation of the patient, in the investigation of hidden affective situations and phantasies, than by hypnosis. Freud's theory was that therapy consisted in a rediscovery of what was once in consciousness and in bringing it back to consciousness chiefly by the aid of the dreams of the night, thus enabling the patient to discharge the affect in a clear-sighted manner and directing it to the demands made by culture.

This briefly epitomized the starting point of psychoanalysis which was followed by many further developments in technic, forming the background also for real advance along all sorts of intellectual and cultural sciences and in every psychological situation. Adaptation and maladaptation, which caused health or sickness, then came to be regarded in the light of evolutionary unfolding, whether racially or repeated again in the life of each individual.

Ferenczi had shown that newer technical advances in therapy lay rather in setting free from within the tendencies already there and which were abundantly supplied with energy for discharge, rather than in the introduction of new ideas from without. A certain amount of guidance had to be given, revealing a broader interpretation and truer valuation of these once hidden tendencies and impulses and a wider possibility of application of them to external interests. Here would come in Adler's law of psychic compensation, the statement of which had been another landmark in insight and method of approach. Original organic or psychic deficiency or inefficiency was unconsciously compensated for by extra psychic drive upon some substituted organ, or perhaps over-development of the same organ, with accompanying psychic compensation or even overcompensation, which in turn caused the disturbance. But it was indispensable to bear in mind that each individual psychic content must be the indication for the special aids applied to his case. To impose from without occupation or amusement was to invite failure, but to allow the patient to use old paths of interest, and find them leading out through their very original value to constructive contact with environment, was in line with the natural advances.

This wide employment of the means at hand in the world of real interests and mutual problems was a most rational but too often neglected form of psychotherapy. Where it had not been successful it had been because of failure to make the attachment along the lines of natural and individual energy discharge. Yet in this lay all hope of mental prophylaxis, especially in the field of child training.

Passing reference to the advances marking neurological investiga-

tion included particularly the attention being directed to the interaction of body and mind through the metabolic processes of the body, especially through the endocrine glands. These studies, too, were comprised in the energy concept, for these mechanisms were interdependent in their action with mental processes. The efficiency of the physical mechanism was dependent upon the psychical, for the psychic as the realm of wider activity, of more extensive and effective energy combinations and transpositions, through images and affect, represented the controlling force behind the physical machine, the impulses which drove it to individual and social or racial ends and, therefore, the field principally where disturbances arose and where causal factors must be sought and understood.

In the field usually set off by the symbol *dementia præcox*, there were very definite psychical considerations, in addition to the somatic agents involved. Here would be found special affective situations. Since the *precox* reaction represented such a decided splitting off and retreat into a specially created phantasy world, it had occurred to the speaker that a special form of personal approach might be of great advantage. It had, at least in some minor instances, been successful. This was the establishment of a triangular transference situation. Confronted with one person alone, the affectivity was put too strongly on the defensive and maintained its closely guarded resistance. Then again, the yielding of the affect would cause too great a psychic disturbance, and might also establish so strong an erotic situation that no intellectual work with the patient could be accomplished and the affective situation would be only worsened. The affective complex group guarded itself, because of its intensity, from external discharge through another person because wholesome synthesis had been lost and exaggeration in one direction had taken its place. A different approach, therefore, might be made in *dementia præcox* and a transference accomplished, not toward one person, but toward two. The specially and psychoanalytically trained nurse being present would allow of this distribution of interest in accordance with the split within the patient's psychical content. The excessive affect could thus have opportunity tentatively and gradually to relieve itself and at the same time it would distribute its force instead of directing it solely at the analyst. The latter method was more successful, as everyone knew, with the patient in whom some intellectual control remained and where such more primitive split had not taken place.

Not only in such severe disturbance as *dementia præcox*, but in other severe maladjustments there was demand for some variation of the mode of approach. Greater elasticity of technic would lie in recognizing this as advisable and making it possible. Special transference situations arose from particular forms of psychoneuroses and psychoses. The sex of the analyst might be an important factor. The woman analyst could



in some cases take the brunt of the first libido onslaught of the explosively affective patient and save the fate of the analysis which would otherwise precipitate itself into a negative transference directed critically against the physician, or forming a resistance barrier in the patient against unconscious complexes and their further analysis. The analysis might then continue in the hands of the woman analyst, or be better forwarded by continuance of treatment, after a few months, by the physician himself.

Such were some of the suggestive opportunities into which experience was forcing the way. The wider vision granted through the opening to investigation and understanding of the unconscious with the mechanisms and revelation of content through them, presented a limitless field.

*Discussion.*—Dr. C. P. Oberndorf said he could not agree with most of the remarks made about transference and resistance. The whole value of a psychoanalysis resolved itself into an overcoming of resistances which dated from childhood. The neurotic came into a conflict of some kind in later life, and found himself facing similar predicaments that he struggled against as a child. He then found he was unable to meet the issue any better than at the original conflict in childhood because of infantile resistance. This resistance could not be overcome by telling the patient that he had it or what he should do. It would be impossible for him to follow the directions of the analyst because resistance must first be overcome. Advising the patient was ineffectual. Many neurotic patients were active in carrying on the world's work and had quite enough to interest them, but their personal problems they had been unable to adjust because they had been unable to release themselves from their childhood resistance. If transference was properly handled, the sex of the analyst should not make any difference; if he maintained a neutral attitude toward his patient, before long the patient would regard him as neutral. As for the jeopardy which Dr. Jelliffe felt would arise from excessive transference, if that was nipped in the bud there would be no great difficulty. The shifting of the patient from one analyst to another because of transference difficulties was a poor makeshift, because the affects would transfer themselves with the patient. That at the outset a patient might feel at ease with one sex more than another was true, but resistance-transference difficulties with either male or female patients were entirely subjective with the patient and must be analyzed to cause their disappearance.

Dr. Jelliffe drew attention to the fact that he had emphasized the fact that one could get out of the patient only what was within him, but he did not agree with Dr. Oberndorf with reference to non-advice or in changing the sex of the analyst, though he might agree with him if psychoanalysts were absolute mirrors. They were not neutral, however. There were special affective strivings which though one might

recognize them could not be handled under all circumstances. It must be admitted that the affective side did show itself and had to be handled by adaptive measures. There was no doubt that the ordinary conscious activities were often difficult to handle and expedients had to be resorted to in order to get pragmatic results, and though it had been said for many years that it was the fault of the analyst if he could not handle all these psychic cases, they did come sometimes too intense to be easily handled. The possibility of adjusting these might be aided by collective work with another analyst, of the same or opposite sex. The dynamic situation could be better handled, more particularly in those cases where the affective reactions were highly nascent and there was great tension, such as characterized the dementia præcox cases. It was a point well worthy of taking into consideration, especially with certain patients.

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## PHILADELPHIA NEUROLOGICAL SOCIETY

REGULAR MEETING, DECEMBER 18, 1918

Dr. MAX BOCHROCH, Presiding

### LATE HEREDITARY SYPHILIS WITH "TIP TOE" GAIT

Dr. N. S. Yawger, through the courtesy of Dr. Lloyd, presented a girl 10 years of age, with supposed inherited syphilis showing a peculiar gait. The disturbance began at the age of six years, the child having been apparently well to this period. She had peculiar pins- and needle-like pains in the heels and began then to walk on the toes. Two years later her speech began to deteriorate, her memory began to fail her and, more recently, within the past six months or so, she has had epileptoid attacks, one or two a day. Tantrums, marked peevishness and irritability have increased and she has become quite unmanageable.

The chief points of interest were that she has become quite demented, has attacks and has a peculiar gait. The legs are held far apart, there is genu recurvatum, there is no spasticity, no Babinski, no ankle clonus. The cranial nerves are apparently intact save there are rigid and fixed pupils. The Bordet-Wassermann reaction was negative, the father's blood was also negative, the mother was dead of unknown causes. The child had Hutchinson teeth, and traces of old corneal ulcers.

In *discussion*, Dr. J. Hendrie Lloyd said that he had observed the patient for some time. That the child was healthy in early life and had only developed the signs described much later. He called particular attention to the fact that the epileptic attacks, the mental and physical deterioration commenced practically at the age of about six. Dr. Lloyd

raised the question as to what was hereditary syphilis and dwelt upon the more narrow interpretation of the transmission of the actual virus through the germ plasm. He therefore preferred to call the disease congenital rather than hereditary syphilis.

Dr. C. W. Burr called attention to the fact that the gait observed in this particular instance seemed to possess more of a psychogenic character rather than one as due to actual somatic disease. The gait in his opinion was not one that could be explained as one having a cortical somatic origin. Therefore the child had, in his opinion, developed a sort of trick walk such as many feeble-minded children develop and which show as peculiar types of grimaces, etc. Dr. A. A. Eshner was inclined to doubt the validity of the evidence upon which the syphilitic nature of the disorder could be posited. Hutchinson teeth were by no means an infallible sign of syphilis and, as is well known, may occur in a number of diseases of nutrition. He was inclined to believe that the serological lack of evidence was of more importance than the positive signs described by the author.

Dr. Alfred Gordon said that the gait reminded him of gaits due to extra-capsular lesions. He commented on a similar type of movement in a patient previously exhibited before the society. Such associated movements were by no means rare and in his opinion the malformation causing the gait was probably due to a lesion of the central nervous system.

Dr. N. P. Stauffer suggested that the patient may have been one of infantile paralysis.

Dr. G. E. Taneyhill said that it was not at all unusual to find negative Wassermann in congenital cases and reported one of juvenile tabes with negative Wassermann but with pleocytosis and colloidal gold reaction. It was desirable in all cases, therefore, to have such spinal fluid examinations if positive deductions were to be made.

Dr. Yawger said, in closing, that the gait reminded him as well of a psychogenic affair and developed the idea that it was probably a compensation for defective muscular power and coördination in the knees, as there were obvious defects in these joints.

### MEDIAN NERVE INJURY DUE TO STAB WOUND

Dr. T. E. Shea presented a peculiar injury which, starting in the hypothenor or ulnar side of the hand, missed the ulnar nerve and cut the median beneath the anterior carpal ligament involving only the superficial fibers, thus giving rise chiefly to sensory disturbances. He developed the idea of trophic disturbances such as are not infrequently found in various infections and toxemias. Such infectious or such toxemias had a tendency to reduce the resistance of the vegetative mechanism in the nerve fiber. He thus commented on the double influence of direct injury and infection as explanatory of the type of change found in the particular instance.

In discussion Dr. Lloyd commented on the fact that similar trophic disturbances had been described consecutive to median nerve injury, referring to a case reported by Sneve in which felons developed followed by gangrene of the terminal phalanx.

Dr. C. S. Potts said he had seen two cases somewhat similar to this one reported in which trophic ulceration of the skin had followed median nerve injury. Both of them had developed blisters and ulcerations as result of injury to the median nerve.

Dr. T. E. Shea said that certain anatomists had said that the sensory fibers in the nerve trunk were more superficial while the motor lay deeper within the nerve fiber and in this particular instance he felt certain that these superficial fibers in the nerve trunk alone had been injured.

### HYSTERIA WITH MANY OPERATIONS

Dr. F. X. Dercum called attention to a very frequent type of occurrence. Patient, a house-maid, was evidently suffering from a number of hysterical conversions which were frequently mistaken for somatic diseases. She suffered therefore from many physicians and surgeons. Appendix was removed in 1908, ovary was removed in 1910, a couple of years later the gall bladder was removed, the kidneys were hitched up a few years later, and again operated on in 1917. Patient had all the ear-marks of a severe hysteria.

In the discussion Dr. Burr commented at some length and with feeling on the frequency with which this type of stupidity was observed. He said that many surgeons seemed to have no conscience at all, much less any knowledge of any psychogenic disorders. He referred to operations on locomotor ataxia and other types of organic nervous disease.

Dr. S. F. Gilpin referred to a patient recently seen, a 14-year-old school girl who had a hysterical aphonia. In twelve years she was operated on seven times in the abdomen and two surgical operations on the nose and throat were performed to cure the aphonia.

Dr. A. Gordon said that useless operations, in his experience, were very frequent. He thought it due not so much to lack of conscience, on the part of the surgeon, but to lack of knowledge both on their part and on the part of general practitioner concerning mental disturbances. There are a whole host of hysterical conversions which even the neurologists do not yet seem to comprehend from a faulty comprehension of the mental mechanisms involved. That until the neurologist post himself better concerning unconscious mental activities what can one expect of the surgeon or of the general practitioner. Dr. Gordon referred to a vast variety of hysterical conversion symptoms involving the uterus, kidney, stomach and other organs. One patient in particular he referred to who, making the rounds of various internists and surgeons, suffered from many diseases and might have had all his organs removed if happily fear had not made him run away from the operating table. This experience seemed to cure him of all his manifold psychogenic pains.

## FRIEDREICH'S ATAXIA IN EARLY LIFE

Dr. F. X. Dercum presented two brothers aged six and four, with typical Friedreich syndrome. No new factors were brought out of any etiological importance nor of clinical significance.

TABES DORSALIS WITH TREATMENT BY  
INTRASPINAL DRAINAGE

Dr. S. F. Gilpin presented a case of tabes treated by mercurial inunctions and intraspinal drainage. Patient was a woman of 49 years of age, 6 children, who began to show her shooting pains four years previous to entrance into the hospital. Clinical symptoms were diagnostic. The laboratory findings were 48 lymphocytes, 1+ blood, and 4+ fluid, Wassermann. After 9 months' treatment fluid Wassermann was ++, lymphocytes 43, following which there was loss of Wassermann and the spinal fluid, and the absence of lymphocytes. The spinal fluid had been drained 30 times and mercurial inunctions had been pushed to the limit.

## NYSTAGMUS ON MONOCULAR VISION

Dr. Alfred Gordon reported a girl of 16 who began to have diminishing vision six years previously. After treatment there was some improvement. On coming to Dr. Gordon examination showed that the eye-movements were normal to binocular vision but when one eye was covered a quick external lateral nystagmus developed. This occurred with both eyes. On extreme lateral vision, one or the other eye would tend to move to the center. Fundus was normal. Astasia was present in the left hand on pointing and there was a diminished knee-jerk on this side. Treatment by mercury and the iodides brought about marked improvement especially in the power of the external recti. The astasia also disappeared. Monocular nystagmus, however, remained unmodified. Dr. Gordon attributed the difficulty to a possible lesion in the muscles of the nucleus of the sixth nerve innervation.

Dr. W. G. Spiller said that he had noticed something that had not been mentioned, namely that the weakness in the external recti was also observable only, or chiefly on monocular vision. On monocular vision the movement of the eyeball outward was very imperfect. It was therefore apparent that there might be an overflow of the innervation of the internal rectus of one eye to the external rectus of the other. Inasmuch as the nystagmus and the external rectus phenomena were developed under similar circumstances the interpretation lay behind the double innervation but the weakness of the external rectus was the more obvious apparent lesion.

## Current Literature

### I. VEGETATIVE NEUROLOGY

#### 1. VEGETATIVE NERVOUS SYSTEM.

**Hoffmann, E.** DIABETIC LIPEMIA AND XANTHOMATOSIS. [Deut. med. Woch., Sept. 19, 1918.]

A soldier, æt. twenty-five years, had a severe diabetes. He presented a multitude of small xanthomata, particularly over the extensor surface of the arms and legs, on the face, buttocks, and prepuce. The blood was whitish and cloudy, this being due to droplets of cholesterin in suspension. There was also a marked lymphocytosis. Histological examination of the tumors showed xanthoma with deposits of a birefringent substance. A pleural collection which developed was also found very rich in fat. At autopsy, Ribbert discovered a striking paucity of the islands of Langerhans. Death was preceded by fever as well as by a marked decrease of the lipemia, due to a more complete combustion resulting from the increased metabolism.

**Roberts, M.** FUNCTION OF CARDIAC VAGUS. [B. M. J., Sept. 14, 1918.]

Few physiological problems seem so confused as that of inhibition. This is due to the rash acceptance of the Weber brothers' theory of the function of the cardiac vagus. Keith now says that H. O. Thomas, a worker at last coming into his own, had expressed the same opinion. It seems that both inferred from different premises that phenomena due to experimental stimulation of the vagus were the result of shock and could not be explained as inhibition. Sherrington in 1906 used the phrase "inhibition, whatever that may be," and it is certain no one knows. To believe that any organism has evolved a mechanism by which the heart can be slowed and finally stopped is absurd. It is reasonable to suppose that the vagus and accelerator fibers are of advantage and act as a safeguard. This cannot be tested by operation and unnatural stimulation or by putting pressure on the vagus, disturbing the cerebral circulation, and producing abnormal phenomena.

During complete healthy rest the heart is practically autonomous; we can therefore infer that the vagus and accelerators help it during stress. Such considerations go to prove that the vagus does not primarily tend to "slow" the heart. Physiological slowing is but the natural concomitant of better functioning, just as the big muscular efforts of a laborer are, and must be, slow if continued. Thus, under stress the



vagus tends to produce the effects seen on the exhibition of digitalis, which can reasonably be inferred to slow the heart by enabling the myocardium to function better. If this is so, shock experiments are not relevant. It seems that physiological vagus action produces more powerful cardiac contractions, which increase coronary circulation and keep the central nervous system blood pressure normal. Probably the stimulus affecting the vagus depends on its increased irritability consequent on a lessened blood supply. This view puts its cardiac action into line with its positive effects on the intestine. It follows that the action of the accelerators is to keep the circulation normal when the heart is no longer able to respond to the vagus by longer, and stronger, and slower contractions, but is still capable of quick, hurried work. If these views are correct, "inhibition" exists only in the casualty ward or laboratory, where shock accounts for the phenomena. H. O. Thomas believed "that inhibition is the suspension of life not the action of special nerves." W. M. Bayliss says that both the vagus and accelerators can be stimulated reflexly. This is, the author holds, their normal function. It follows that to declare, as pharmacologists do, that the action of the vagus tends to render tone less complete than digitalis is to misunderstand the problem. The features of the third stage of digitalis poisoning are merely those of cardiac failure, and the quickening of the pulse is due to the accelerators coming into reflex play to save the organism. If they fail, the efforts of the dying heart degenerate into the incoördinated twitches of the separate fibers which form the prelude to the running pulse and death.

Such a view squares with physiology and pharmacology, but when digitalis action has to fit in with the Webers' theory the difficulties are insurmountable. To speak of a heart which has obviously been helped to do its work more quietly and thoroughly as having been inhibited is to confuse the inquiry and misuse language. The Weber brothers discovered an interesting pathological fact which has no particular value, except so far as it throws light on the obscure complexes of shock. H. O. Thomas actually write in 1883: "In proof that mechanical irritation of this nerve (vagus) induces a condition of shock we have the accepted fact that atropine protects the nerve from the shock consequent on mechanical disturbance. I have not yet met with any evidence which proves the existence of an inhibitory nerve fibers in this or any other nerve."

It seems that the confusion in inhibition is due to the wrong belief that such nerves exist. The final explanation of the phenomena which now seems to depend on them will probably show that any nerve is only "inhibited" when another, acting in the same area, is more strongly stimulated. The inhibition of one reflex is the dominance of another, just as, according to Herbart, any mental presentation can be suppressed, or "inhibited," by another strong enough to displace it in causing motor reactions. H. O. Thomas seems to have derived his views largely

from a study of drugs, and his work may throw light on the so-called reversal effects of strychnine in converting "inhibition" into excitation by the selective effect of such a drug on certain reflexes.

**Berti and Roncàto.** REGULATORY NERVES OF HEPATIC GLYCOGENESIS. [Gazetta d. Ospedali d. Clin., May 5, 1918.]

There is presented here a review of the experimental work to determine the part played by the vagus in hepatic glycogenesis. The work of Vasoin, 1903, resulted in the following conclusions: (1) In frogs kept at hibernating temperature but with the vagus cut there was evident no change in the quantity of the glycogen content nor in the weight of the liver; (2) in frogs revived from the hibernating condition there was a marked diminution in the hepatic glycogen in the frogs where the vagus had been removed as compared with normal frogs under the same conditions; (3) moreover the weight of the liver in these same frogs with the vagus cut diminished in much greater proportion than in the normal animals.

Vasoin therefore concluded that the vagus inhibits the transformation of hepatic glucose, which is promoted by increase of temperature, and that therefore it contains glyco-inhibitory fibers. This was confirmed in 1907 by Farini and in 1910 by Berti and Roncàto at a lower temperature than first used, since Soprana had found that there were marked respiratory disturbances at a higher temperature, which might have influenced the former results. But by lowering the temperature they still reached the same outcome.

These facts are in full accord, as are others made in the Istituto di Fisiologia di Padova, with Langley's theory that the centrifugal nerve fibers known as the autonomic are not only of sympathetic origin but also consist of distinct fibers from the cerebrospinal axis. The glycogenic function of the liver appears to be regulated as much by the sympathetic as by the autonomic system of the vagus and the action of these sympathetic fibers is opposed to that of the vagus fibers. This also agrees with pharmacological experiment. The school of von Noorden also affirm that hepatic glycogenesis is promoted by the sympathetic and inhibited by the vagus. They base their belief upon these facts: (1) Adrenalin, which stimulates the organs of termination of the sympathetic fibers, produces hyperglycemia or glycosuria, irrespective of a lessened consumption of glucose; (2) pilocarpine arrests this glycosuria, this being known to stimulate the organs of termination of the craniosacral autonomic system, including the vagus. (3) glycosuria can in some cases be obtained by the administration of atropin, which is known to paralyze the organs of termination of the fibers of the vagus. This difference in the production of glycosuria in different cases is due to difference in tone in either the sympathetic autonomic system or the cranio-sacral autonomic in different individuals. Rossi has made some researches

which confirm the same thing, though these are still unpublished. Various investigators in various places have therefore established the same facts; that the output of glycogen from the liver into the blood is regulated by the nervous system through the glyco-secretory fibers of the autonomic system of the sympathetic and through the glyco-inhibitory fibers of the cranio-sacral autonomic system, that is through the vagus.

JELLIFFE.

**Besche, A.** ASTHMA AND CONSTITUTIONAL EXUDATIVE DIATHESIS. [Berl. kl. Woch., Sept. 23, 1918.]

Hypersensibility to horse-manure is reported in this patient. This idiosyncrasy became evident after injection of antidiphtheritic serum when the subject ate sausages containing horseflesh. The blood when injected into a guinea-pig, caused hypersensitiveness to horse serum after the lapse of forty-eight hours. The anaphylaxis was also local. If his finger had come in contact with a horse and then touched the conjunctivæ the result was a mild edema of the mucosa touched. This ocular reaction had been seen in eleven cases of "equine asthma" and in another asthma occurred when a cat had been the pet. Certain asthmatic patients react to other domesticated animals as etiological factors of their paroxysms. No data of a psychogenic nature are available and the author seems oblivious of the fact that similar phenomena are known of purely psychogenic etiology.

**Miller, W. S.** THE NERVES AND GANGLIA OF THE LUNG IN A CASE OF PULMONARY TUBERCULOSIS. [American Review of Tuberculosis, May, 1918.]

The author describes the distribution of the nerves and ganglia within the lung in a case of rapid tuberculosis occurring in a teamster, forty-seven years of age, the duration of the disease being about seven months. The author found that distribution of the nerves and ganglia—in a tuberculous lung—differed in no respect from the normal. Tuberculosis does not occasion an increase in the number of nerves or ganglia in the lung. The lungs receive their nerve supply from the pneumogastric nerve reinforced by branches from the second, third, and sometimes the fourth thoracic ganglia of the sympathetic. These follow the bronchi throughout their course, diminishing in size with the diminishing caliber of the bronchi. In many places not only these nerves but also the main nerve trunks are highly inflamed, being surrounded by and infiltrated with a large number of lymphocytes. Ganglia were found surrounded by and infiltrated with lymphocytes, showing that they, as well as the nerves, were involved in the general inflammatory process. This study gave rise to several questions: Might not the increased activity of the glands be due to the irritation of the nerves and ganglia; might not the irritating and productive cough in some cases of tuberculosis and the dry

hacking cough in other cases be due to nerve irritation; might not the nervous hyperesthetic condition accompanied by very shallow breathing which was a frequent result of gas poisoning in the present war be due in some measure to irritation of this nervous apparatus of the lung?

**Reede, E. H.** THE RÔLE OF THE VEGETATIVE NERVOUS SYSTEM IN CERTAIN DISEASES OF THE SKIN. [Dermatological Section, A. M. A., Chicago, June 14.]

The vegetative nervous system represents the primitive ganglionic system of the lower vertebrates and controls the metabolic functions which are the basis of life (Jelliffe and White). The control of metabolism arises through the interaction of the vegetative nerves and the endocrine glands which together form one mechanism—the neuro-endocrinological mechanism. Two actions arise in the vegetative system, one a condition of accelerated metabolism, associated with overaction of the great energy-producing endocrines, the gonads, suprarenals and the pituitary and with signs of increased sympathetic nerve tone. The other is a condition of retarded metabolism associated with low activity in these glands and with signs of low sympathetic nerve tone or a relative high para-sympathetic tone or vagotony. The thyroid has no distinctive nerve influence since its action is that of an intracellular metabolic accelerator and simple exaggerated preëxisting types. Therefore, instead of looking for uniglandular disease as at present done, a greater advance will occur if an attempt be made to recognize conditions of increased metabolism or its obverse, and conditions of sympathicotony and its obverse realizing that they point to endocrine disturbance. The skin is singularly responsive to disturbances of metabolism throughout the body. Disturbances in skin metabolism may point first to vegetative nerve or endocrine disturbance. Sympathicotonic skin disturbances point to overactivity of suprarenals, gonads or pituitary. Vagatonic skin disturbance may mean a thyrogenic accentuation of a constitutional vagotony or an exhaustion reaction in these same glands.

Stimulation of the neuro-endocrinological mechanism results in sympathetic stimulation or depression and it may arise from 3 agents. (1) Bacterio-toxic, acting on nerve or glands. (2) Metabolic, engendered by a growth demand from the body as a whole, from an organ as a part or from an organ for an increase of function. (3) Affective radiations from the central system arising in the instinctive emotions either in consciousness or from repressions into the unconscious. These stimuli vary in their results, depending on their occurrence in infancy, or in adolescence or in maturity. Suggestive cases are cited: (1) Pathological blushing in a case conforming to Cannon's criteria of suprarenal overaction, *i. e.*, reduced coagulation time, increase in blood sugar, increased blood pressure, increased heart rate, shifted circulation, relieved by uncovering a sexual complex through psychoanalysis. (2) A

Raynaud-like multiple gangrene of the extremities occurring in a case of goiter. (3) Deep pigmentation in a case having the blood picture of pernicious anemia, the gastric symptoms of achylia gastrica and the autopsy finding of cystic adrenals. (Author's abstract.)

**Sabouraud.** PROGNOSTIC AND SYMPTOMATIC VALUE OF "MARBLED NAILS."  
[Presse Med., Sept. 27, 1918. Ed. Med. Rec.]

Knowledge of the petty symptoms of disease is not now cultivated with the acumen of prescientific days. What practitioner nowadays gives any heed to leuconychia—the white spots on the nails? These details are abandoned to the laity and the pseudologists. Sabouraud, however, insists that these white spots have both diagnostic and prognostic value. He has often seen them in the following associations: pre-tuberculosis in the young, neurasthenia of the phobic type, and chronic alopecia—all in the male sex. In females they are more common than in males, and appear to occur by preference in neurasthenics; for example, in young girls who are mentally depressed and who talk much of suicide and have one or another phobia, such as the presence of down on the upper lip which they fancy makes them repulsive to others. Or perhaps their fear that their hair or eye-brows are falling out. These attitudes are the cause or result of mental depression. Leuconychia is common among young women with skin diseases of various kinds independent of site. It is not believed to be due to the toxin of tuberculosis when seen in candidates for consumption, but to inferior nutrition; for it is equally encountered in hereditary syphilis. The woman who is always tired without sufficient cause is very apt to exhibit these spots. Sabouraud has seen them excessively developed in simple goiter and Graves' disease. As stated before there is some connection between them and alopecia of long duration and this form may be associated with other anomalies of the nails. To sum up, Sabouraud believes it is a bad symptom, but not a grave one. It does not foretell death, but it is never seen in a healthy subject. We see it in arterial hypotension and mental depression. It is never present by mere chance and whenever present is a sort of vague menace of poor mental or physical health.

## 2. ENDOCRINOPATHIES.

**Nordentoft, S.** ROENTGEN TREATMENT OF EXOPHTHALMIC GOITER.  
[Ugeskrift for Læger, Copenhagen, Aug. 22, 1918.]

Nordentoft reports fifty cases of exophthalmic goiter given roentgen treatment, and discusses the participation of the thymus. The roentgen exposure was made for from forty to sixty minutes, at one sitting. Two or three exposures generally sufficed, with intervals of from four to eight or six weeks. The subjective improvement was marked from the first, the restlessness, tremor and subjective heart disturbances subsiding first, the goiter and exophthalmos more gradually; the tachycardia

last of all. Even in the most favorable cases, the patients still display an unstable pulse and tendency to tachycardia on slight provocation. In several cases the desired effect was realized with a single exposure. This method of a few large doses with long intervals may be better adapted for certain cases than for others, as time will reveal. In any event, it is far more convenient for all concerned than a larger number of smaller doses. His fifty patients were given a total of ninety-nine sittings; in eighty-four the thymus was exposed as well as the thyroid, as he is convinced that the thymus is a factor in certain cases of exophthalmic goiter. He cites a number of cases from the literature in which with exophthalmos and tremor, etc., the thyroid was of normal size while the thymus was much enlarged, and marked improvement followed thymectomy. The thyroid and the thymus under other conditions seem to have an antagonistic action, but with exophthalmic goiter they seem to work in concert.

He presents series of data which sustain the assumption of a "thymus Basedow" and a "thymogenous exophthalmic goiter." If the thymus is mainly responsible, then removal of the thyroid would have little effect on the disease. The thymus is the organ that should be removed in such a case. This might entail spontaneous retrogression of the thyroid. These assumptions throw light on the 20 per cent. of failures reported in the larger statistics of thyroidectomies. He describes several cases of probable thymus origin, one in a man of 50 who had been under treatment for exophthalmic goiter two years before. The tachycardia, palpitations, slight exophthalmos, tremor, and Graefe's symptom, but no Moebius' symptoms, were not accompanied by goiter, but they were so severe as to incapacitate him completely. His thyroid and thymus were given a single roentgen exposure, and within two months apparently complete health was regained and has persisted during the five months since.

Such experiences teach the necessity for applying roentgen treatment to the thymus as well as to the thyroid, or possibly to the thymus alone at the first sitting. Operative removal of the thyroid should not be done until after the failure of roentgen treatment, which Nordentoft says will be of rare occurrence. He queries whether it is not our duty to expose the thymus to the roentgen rays before any operation on the thyroid. In Sølling's post-mortem examination of eighteen exophthalmic goiter cases he found a persisting thymus in sixteen. The question also arises whether the cases of exophthalmic goiter that respond most promptly and favorably to roentgen treatment may not be those of thymogenous origin. Thymectomy is a dangerous operation, but the thymus is exceptionally sensitive to the roentgen rays. The effect begins to be apparent in about twenty-four hours. He reports some cases of spasm of the glottis with hypertrophied thymus, cured by roentgen exposure of the thymus. In conclusion he cites statistics showing 13 per



cent. fatal cases of exophthalmic goiter among 1,300 given medical treatment alone, and 25 per cent. in the seventy-five cases at the Frederiks Hospital. In contrast to this is the zero mortality in Fischer's ninety-four and his own fifty cases given roentgen treatment. The full details of his fifty cases are tabulated. More or less benefit was realized in all and the improvement has persisted to date; only a few have been lost track of. [J. A. M. A.]

**Fenger, F.** SEASONAL VARIATION IN THE IODINE CONTENT OF THE THYROID GLAND. [Endocrinology, April-June, 1918.]

The author reports the results of analyses carried out from 1914 to 1917 on the desiccated thyroids of cattle, hogs, and sheep. This work confirms his previous investigations, showing that there is two to three times as much iodine present in the glands between the months of June and November as between December and May. These fluctuations seem to be due to temperature.

**Rogoff, J. M.** LIBERATION OF INTERNAL SECRETION OF THYROID INTO BLOOD. [Jl. Pharmacology, Oct., 1918.]

Is it possible, asks the author, to detect, in the blood coming from the thyroid, a substance, the physiological activity of which is identical with that obtained by the use of the gland? This is a preliminary set of experiments with blood of dogs. The tadpole reaction was employed. One dog, with thyroid rich in colloid and with a good iodine content, gave evidence of an active secretion collected from the glands during massage and during electrical stimulation of the cervical sympathetic. Two dogs whose thyroid glands were hyperplastic and contained no detectable iodine yielded results which the author interpreted as negative.

**Fournier, J. C. M.** A CASE OF ACHONDROPLASIA WITH FAMILIAL ANTECEDENTS OF HYPOTHYROIDISM. [Anales de la Facultad de Medicina, Jan.-Feb., 1918.]

Fournier reports a patient who showed from his earliest days a morphologic dystrophy so that, at the age of 15 years, his trunk had almost the development of an adult, while his limbs were those of an infant. There was a brachycephalic macrocephaly, a micromelia of the rhizomelic type. His hand was the trident hand described by Marie and he had a lumbar lordosis. The musculature was thickest and of an athletic type. The radiographic testimony confirmed all the other evidences of achondroplasia. The patient comes of healthy parents and his brothers are of normal height and health. There is no suspicion of syphilis, tuberculosis, alcoholism or the like. But in the father's family there are symptoms of thyroid deficiency and the patient's sister and two brothers manifest different degrees of thyroid deficiency, acquired at about 40

years of age. Various theories might be brought forward to explain the pathogenesis of this case. There is the atavistic theory; that of toxic infection, namely that certain toxic agents exert a selective activity upon the joint cartilages; or the theory of endocrinic disturbance in which the infantilism is a product of an internal hypergenitalism upon a foundation of insufficiency of thyroid and hypophysis. The presence of such a familial hypothyroidism, together with an exaggerated development of the genital organs in the patient, an excessive hypertrichosis, the exaggerated muscular development and the rapid development of an adult voice timbre throw the weight of acceptance upon the last theory. This, however, the author leaves for future studies of achondroplasia to establish. [J.]

**Kendall, E. C.** IODIN COMPOUND OF THYROID. [J. A. M. A., Sept. 14, 1918.]

The active constituent of the thyroid chemical groups responsible for its physiologic activity is here discussed as to its nature and mode of action. The ultimate analysis of the compound is given, and the physiologic investigation has shown that in pure crystalline form it will increase the energy output of the animal organism. Plummer's explanation for the function of the thyroid is that it determines the amount of energy produced by any given cell in the body due to stimulation either from within or without. As soon as the metabolic rate increases, fundamental changes are produced. Symptoms due to subnormal activity of tissues will be relieved, but if the metabolic rate is carried high enough the symptoms of hyperthyroidism will appear. It is of great interest, therefore, to determine the chemical nature of this iodine-containing compound so important in normal physiology, and Kendall gives account of the methods of study. At first he attempted to show that the activity of thyroxine was due to the oxygen condensing with the amino group of an amino-acid and the carboxyl group of the amino-acid reacting with the imino group of thyroxine. It is found, however, that this does not occur; but that the physiologic activity of the substance is produced by the CO-NH groups. He gives the results of the investigation proving this stated in chemical terms. Patients with complete atrophy of the thyroid have basal metabolic rates approximately 40 per cent. below normal, but it has been shown that administration of thyroxine alone can restore and maintain the metabolic rate in these persons. But in complete atrophy of the thyroid, thyroxine may be assumed to be absent, or nearly so, and the author asks what maintains energy output from 100 per cent. below normal, which would be fatal, up to 40 per cent. below normal, the point to which basal metabolism sinks in the absence of thyroxine, and suggests that other chemical substances in the body having the same grouping as thyroxine may be capable of this. These are amino-acids and protein, creatine and creatinine and a few other

less well known compounds. It seems probable, Kendall says, that on the administration of thyroxin a reaction that has been carried on within the body by other compounds is merely increased in rate, but that there is no other difference or disturbance of the reactions. The exact chemical reactions involved when this substance functions are still unknown. That the active groups present in thyroxin are a necessary mechanism for the production of energy within the body seems highly probable, and it is of great interest and significance that there is a close analogy between this substance, whose exact effect on metabolism is known, and other substances, which are also intimately associated with the reactions occurring within the animal organism.

**Rogoff, J. M.** SOLUBLE PRODUCT OF THE THYROID GLAND. [Jl. Pharmacol., Oct., 1918.]

The product "A," of Kendall, obtained from thyroids of hogs, was subjected by Rogoff to further hydrolysis in water acidified with hydrochloric acid. When the substance was digested the solution was filtered through a Chamberland filter. Hydrated aluminum silicate was added and the mixture shaken and filtered through paper. This silicate was washed with water. Further chemical manipulation (see original) gave an aqueous solution which was reddish brown and on evaporation yielded an amorphous powder. This powder contained 13.44 mg. of iodine per gram of dry substance and the product "A" from which it was obtained contained 16 mg. per gram. A small quantity of the product was available for feeding experiments with tadpoles. This product showed very nearly the same degree of activity as the product "A" from which it was obtained.

**Gordinier, H. C.** MEDICAL TREATMENT OF GRAVES' DISEASE. [Dominion Medical Monthly, Oct., 1918.]

The author points out that every case should be examined for local infection. Mild or incipient cases are cured by prolonged rest, hygienic and medical means; fifty per cent. of the more advanced cases are curable by the same methods. If a case has been under medical care for some time without improvement it should be placed in the hands of an experienced surgeon, skilled in thyroid work. Cases showing myocardial insufficiency or serious arrhythmias, as alternation, fibrillation, or flutter, should be treated medically. X-ray pictures of the chest should be taken to discover extraneously placed accessory or dipped thyroids and to determine the size of the thymus gland. The ideal treatment is enforced therapeutic rest.

**Secher, K.** DEATH FOLLOWING ROENTGEN TREATMENT OF EXOPHTHALMIC GOITER. [Ugesk. f. Laeger., Oct. 10, 1918.]

The author reiterates that the enlarged thyroid gland responds to roentgen treatment in very different ways in different cases. In several

cases cited, an ordinary goiter seemed to become transformed into the exophthalmic type under roentgen treatment. Belot and Simon, among others, have declared that a correctly given course of roentgen treatment is free from danger, but Secher insists that this is not true. The thyroid may be whipped up to function to excess, or it may become functionally insufficient. A tendency to myxedema, however, is rare, but numerous cases of aggravation of hyperthyroidism have been reported, even with the most modern improved technic. Rieder and Vering have reported each one or two cases in which the aggravation was so intense that the patient died, and Secher now adds another case to this list of fatalities. His patient was an unmarried woman of 40, previously healthy until exophthalmic goiter developed. The thyroid was given roentgen treatment after a year, eight exposures, each  $\frac{1}{2}$  Sabouraud-Noiré unit, distributed in four fields, three on the thyroid and one on the thymus. Her symptoms became much aggravated at once, with restlessness, choreiform movements, pulse 100 to 200, and heart beat up to 240, respiration 72, and death the fifth day. The thyroid showed very slight changes and the thymus nothing abnormal. [J. A. M. A.]

**Tracy, E. A.** SUPPURATION OF GOITROUS THYROID FOLLOWING ADMINISTRATION OF THYROID EXTRACT. [Endocrinology, April-June, 1918.]

Tracy describes a case which illustrates the care with which thyroid extract must be given. The patient was a widow, aged fifty-one years, was sleepy in the daytime and melancholic, probably owing to the fact that her son was in prison. She had a moderate-sized goiter. One half grain of desiccated thyroid after each meal was prescribed. After a week of treatment the right lobe of the thyroid became painful, and the treatment was discontinued. After two weeks the painful lobe reddened, and later broke. After three days the patient, prescribing for herself, applied a bread and water poultice. The appearance of the sloughing lobe of the thyroid was alarming, so that a sulphonaphthol poultice was applied every three hours. After a few days the dead thyroid tissue was snipped off, and antiseptic treatment continued until healing occurred four months later. In passing, it may be remarked that the mental symptoms cleared up quickly after the administration of the desiccated thyroid. In goiter with myxedematous symptoms Tracy recommends an initial dose of one half grain of desiccated thyroid daily, with careful attention to the least sign of trouble, such as pain in the thyroid, when medication should be stopped. The dose may have been sufficient to awaken the tissue to renewed activity, but if not, treatment with the same careful watching should be begun again.

**Balfour, D. C.** CANCER OF THYROID. [Med. Rec., Nov. 16, 1918. J. A. M. A.]

One hundred and three cases of cancer of the thyroid were seen in the Mayo Clinic, a percentage of 1.6 of 6,359 cases of goiter, exclusive of the exophthalmic group. The cancer incidence, based on 14,456 patients with goiters, is 1.19 per cent. Of the 103 patients, 81.5 per cent. were more than 40 years old. Sixty-eight (68 per cent.) of the patients were females, thirty-five (35 per cent.) were males. The most important lesson to be drawn from an analysis of these cases, Balfour says, is the fact that in 46 per cent. no clinical manifestations of the disease were in evidence. This group shows by far the highest percentage (about 70) of patients free from recurrence at the present time. In other words, the great majority of apparent cures have occurred in those cases in which the malignant change was an unexpected finding. Total thyroidectomy was rarely performed in this group. In most instances the lobe containing the tumor and the malignant process was removed, but in many the enucleation of an adenoma was the procedure. The analysis showed also that when clinical evidences of cancer are present the results of surgical treatment are discouraging. Total extirpation of the gland appears to be indicated only when both lobes are grossly involved in the disease, and when past experience warrants surgical interference in the particular case. Recognizable involvement of cervical glands usually means that the time for surgical cure is past. Occasionally, however, just as the unexpected occurs in the treatment of extensive cancer elsewhere, an apparent cure is obtained. Gross involvement of trachea or esophagus is almost a certain sign against curability. In this series the average number of years of abnormal growth in the thyroid preceding the operation was 11.6. This Balfour regards as being proof positive of the advisability of the early removal of well-developed thyroid nodules.

**Barker, L. F.** EXOPHTHALMIC GOITER. [J. A. M. A., Aug. 3, 1918.]

Barker says that intimate interrelationship of the endocrine glands and the nervous system is nowhere better illustrated than in the symptomatology of exophthalmic goiter. While it is generally agreed that exophthalmic goiter is a thyroid intoxication it is not surprising that it is still described as a nervous disease. Of the four cardinal symptoms of exophthalmic goiter—tachycardia, struma, tremor, and protrusion of the eyeballs—no less than three of them are due to abnormal innervations and there are hosts of minor symptoms in which neuropathic and psychopathic phenomena predominate. At present any study of the symptoms must take in metabolism and an extensive inquiry into the domain of nervous pathology. The author gives quite a list of symptoms directly referable to disturbances of the vegetative nervous system in which the larger number of pathologic-physiologic phenomena occur and he says that this

is long enough and familiar enough to us to show at once the prevalence of autonomic symptoms and signs. Though one or several of these may appear simultaneously they are never all present in the same case at once. Many of them are the opposite of each other, indicating the double innervation that exists in the autonomic system which makes some of them reciprocally antagonistic. Certain stimuli we know will pick out one set of fibers and leave the other set unaffected and different individuals may be specially liable to troubles of one or the other. Very peculiar conditions are sometimes met with owing to this and other facts. The author enumerates the phenomena referable to the peripheral neurons of the cerebrospinal nervous system. What has surprised him most in the study of the patients exhibiting exophthalmic goiter, as far as the peripheral nerves are concerned, has been the constant presence of extensive evidence of disturbed function of the peripheral autonomic nerves in contrast with the apparent absence of evidence (except in rare instances) of disturbance of function of the peripheral cerebrospinal nerves. None of the grosser organic lesions of the brain and spinal cord sometimes met with in the course of exophthalmic goiter seems to stand in any relation of effect to the thyrotoxic cause. The evidence for an epilepsy of thyrotoxic origin is still too incomplete, and the characteristic fine tremor is doubtless cerebral in origin, but we cannot explain it pathogenically any more than we can account for other pathologic tremors. The neurotic and psychotic symptoms are most interesting. The neurasthenic and anxiety states, the phobias and obsessions are notorious, and outspoken psychoses are not at all uncommon, especially when there is a hereditary taint. The behavior of the patient is more or less abnormal and it seems to Barker as if the fundamental instinctive mechanisms are often functioning abnormally. How far the nervous symptoms and especially the pathologic emotivity depend on the direct intoxication of the brain, and how indirect effects on the higher nervous apparatus through an intoxication of the vegetative nervous system or of all the body cells concerned in metabolism are brought about is yet unknown to us. He is personally inclined to lay more and more stress on injury to the lower and more primitive mechanisms.

**Watson, L. F.** GOITER IN PREGNANCY. [J. A. M. A., Sept. 14, 1918.]

Exophthalmic goiter in pregnancy is rare, owing to the restraining influence the disease exerts on conception. He believes that cases of goiter that have not lasted long cause the patients to ascribe their symptoms at pregnancy to that condition, while in reality they are due to a beginning hyperthyroidism. One of the best means we have of furthering the study of this obscure subject is by reporting and discussing the few cases we see. The author reviews some of the work that has been done in the way of animal experiments, and says that it is the opinion



that physiologic enlargement of the thyroid is most frequent in regions where goiter is prevalent. The subjective thyroid disturbances are usually most pronounced during the first two or four months of pregnancy. After the fifth month subjective improvement usually occurs or the symptoms increase and hyperplasia develops with or without ocular symptoms. The patient with increasing symptoms is liable to have hemorrhages and abort. It is generally agreed that any operation on the thyroid is more dangerous during pregnancy than at other times, and therefore it is opposed by most surgeons. He has himself had good results with quinin and urea injections made directly into the gland to produce localized aseptic necrosis of a portion of the overgrowth. Obstetricians, surgeons and internists agree that any procedure for the treatment of goiter must be based on a period of rest, with medical, dietetic and hygienic measures suited to the needs. Organotherapy has an established place in the treatment of goiter in pregnancy with neurasthenia or deficient thyroid function, and in the presence of hyperthyroidism, if the symptoms steadily become worse in spite of conservative measures, induced abortion is sometimes needed for relief. If the child is viable, cesarean section should be done. The danger of eclampsia is increased in this case, and of it the ammonia nitrogen is the best index. Operation on the thyroid is indicated to relieve pressure symptoms mainly, and pregnant women with subthyroid conditions should receive iodids or thyroid during gestation.

**Gram, H. C.** EXOPHTHALMIC GOITER IN CHILDREN. [Hospitalstidende, July 10, 1918.]

After a review of the literature of the subject, with special emphasis bearing on the matter of great growth variability in height in children the author concludes that this disease is rare in children. Sattler's important monograph on the subject reports only 184 children under 15 in 3,477 cases of exophthalmic goiter then on record. It is not infrequently known to meet with some slight enlargement of the thyroid in girls approaching puberty with mild nervous manifestations and tendency to tachycardia—evidently an exaggeration of the hyperthyroidism at this time. Holmgren in 1906 called attention to the excessive growth in height which occurs in these conditions. The epiphyses became consolidated, comparatively soon after however, so that growth has to cease after this spurt, the children not being exceptionally tall when they reach their majority. The study of the growth curve then is of great importance in detecting this important modification. Gram here reports in detail three typical cases. The girls were harmoniously developed, with menstruation at 12. At 13, they were 13.5 and 10 cm. taller than the average for their age.

Goyanes, J. GOITER IN SPAIN. [Siglo Med., Feb. 2, 1918.]

In his study of the foci of goiter in Spain, the frequency of deaf-mutism among the families with goiter is commented on. Exophthalmic goiter is rare. Cretinism is frequent. In one family two of the daughters of a goitrous mother are deafmutes. Deafmutes with goiter in the district of Avila, and also deafmute cretins are frequent. Goiter in the mother or father or grandparents of the cretins was almost invariable.

Paton, Findlay and Watson. PARATHYROIDS AND TETANY. [Edit. J. A. M. A., Nov. 16, 1918.]

However expressive the word "idiopathic" may be as an indication of definite symptoms or as the designation of a recognized clinical entity, it almost invariably leaves a query in the mind of the critical student as to the underlying cause or significance of what is described thereby. This has long been true of idiopathic tetany or spasmophilia. This hyperexcitable state of the nervous system is manifested by a spastic condition of the muscles of the extremities, by laryngeal spasm, and by epileptiform convulsions in its active state. In the more recently described latent forms there is merely an increased response to mechanical or electrical stimulation of the peripheral nerves. In childhood, idiopathic tetany is usually associated with rickets; in adult life, its incidence goes with dilatation of the stomach, pregnancy, certain infections, and a few occupations. These facts have long been known.

Of the many causes that have been assigned to this spasmophilia—disease of the brain, "rheumatism," metabolic derangements, specific infection, and endocrine abnormalities, the last has offered the greatest possibility of opening the way to a better understanding of the etiology. Although the possible association of the parathyroids with tetany was suggested by clinical workers as early as 1902, it has been the experimental physiologists who have made the more convincing contributions to the subject. So long as the independence of the thyroids and parathyroids was not clearly recognized and demonstrated, there was bound to be confusion in the investigation of the physiology and pathology of these organs. Now that the demonstration of their individuality and embryologically separate origin is accepted, it is worth while to consider more seriously the claims as to the relation of the parathyroids to the clinically recognized forms of idiopathic tetany.

There is agreement to-day among experimentalists that the nervous symptoms described often in the past as occurring after thyroidectomy are due to removal of the parathyroids. Too little attention has been paid to the noteworthy series of contributions from the Department of Physiology at the University of Glasgow which won the 1916 Warren Triennial Prize for the Massachusetts General Hospital for D. Noël Paton and his co-workers. They agree that all the nervous symptoms are undoubtedly due to the condition of the central nervous system.

Section of the nerves to any part of the body entirely and immediately abolishes all spasms, tremors and jerkings of the muscles supplied. Consequently the condition of the peripheral neuro-muscular mechanism is not likely to be the occasion for the primary action in the production of the symptoms. The parts played by the spinal, cerebellar and cerebral arcs are by no means yet clear.

Paton, Findlay and Watson agree that undoubtedly the most constant change after parathyroidectomy is the increase in the response to galvanic stimulation. This hyperexcitability has long been referred to as a valuable sign of the condition of tetania thyreopriva, especially when other symptoms are not conspicuous. The Glasgow investigators, in their extensive researches on this subject, have established that the absence of a direct relationship between the severity of the nervous symptoms and the electrical excitability of the peripheral neuro-muscular mechanism is a clear proof that this altered excitability is a phenomenon of secondary importance to the changes in the central nervous system, and that it cannot be taken as a measure of the severity of these disturbances.

In searching for a further index to the causes of the symptoms recorded, attention has been centered on metabolic phenomena. According to the observations of Paton and his collaborators, we are encouraged to believe that there is no evidence of a direct controlling influence of the parathyroids over the central nervous system. The symptoms of the tetany following parathyroidectomy are also not primarily due to the loss of calcium from the body, as was postulated at one time. Paton and Findlay have observed, however, that the phenomena of guanidin poisoning correspond very closely with those of tetania thyreopriva. Furthermore, they found a marked increase in guanidin and methyl guanidin in the blood and urine of animals after removal of the parathyroids and also in the urine of children suffering from idiopathic tetany. Hence the conclusion that the parathyroids control the metabolism of guanidin in the body by preventing its development in undue amounts. In this way, they probably exercise some regulative action on the tone of the skeletal muscles. Finally, the same investigators suggest that tetania thyreopriva and idiopathic tetany are identical as regards their characters and metabolism, and although the histologic evidence is not conclusive, in all probability the parathyroids are implicated in both conditions. The metabolic history of the guanidin manifestations remains undetermined. A relationship between it and creatin has often been postulated. Perhaps this will be a profitable direction for the prosecution of future studies in this field, particularly since the striking similarity between an experimentally obtainable condition and a recognized clinical entity has been pointed out.

**Henderson, P. S.** GUANIDIN CONTENT OF MUSCLE IN TETANIA PARATHYREOPRIVA. [JOUR. OF PHYSIOL., APR., 1918.]

A report is made upon experiments to determine the source of the guanidin which has been shown as acting upon the motor cells of the spinal cord when the symptoms of tetania parathyreopriva are present. There is also an increase of this substance in the blood and urine. The first experiments were made to determine the total guanidin, the free guanidin of muscle, the creatin guanidin and guanidin in such complexes as arginin. The search was also to determine whether, if this excess guanidin comes from muscle, the amount is modified after ablation of the parathyroids. The creatin was also subjected to investigation, since it is methyl guanidin acetic acid and since it is related to the tone of muscle.

It was found that there is a fall, after parathyroidectomy, in the total and free guanidin in muscle and a rise in the creatin, both absolutely and in relation to the total amount of nitrogen. The rise of the creatin nitrogen may represent a synthesis of part of the nitrogen which shows a corresponding decrease in the free guanidin nitrogen. But the fall in the total guanidin exceeds by far the nitrogen in free guanidin and creatin. This seems to mean that either guanidin is liberated from the muscle or that the muscle fails to take up guanidin formed elsewhere. This may be correlated with the increase of guanidin in blood and urine. Whether there is also an increase of guanidin formation in other organs is still under investigation. [J.]

**Hertz, A. F.** PARATHYROID INSUFFICIENCY. [Endocrinology, April-June, 1918.]

The author reports the case of a clerk, forty-seven years of age, whose symptoms appeared to be due to a functional insufficiency of the parathyroid glands. He was first seen in 1910 and was under the author's observation for four years. In 1908 the greater part of the thyroid gland had been removed because of enlargement of the gland. After this he had remained well until four months before consulting Doctor Hertz, when he had become suddenly depressed, nervous, restless, and sleepless. There was a constant fibrillary twitching of the eyelids, but tetany was never present. His eyes were sunken; the thyroid gland could not be seen or felt, and though the patient's appetite was enormous, he constantly lost weight. There was some difficulty in swallowing, which fluoroscopic examination showed was due to an irregular spasmodic contraction of the esophagus. He passed three or four large stools a day; the urine was normal, but diminished in quantity. His pulse was constantly about 120; his face and neck were deeply flushed; his hair had stopped growing, and he had become completely impotent. A definite diagnosis was not made, but it seemed obvious that the disease was of endocrine origin, possibly due to injury of the parathyroids dur-

ing the previous thyroid operation. Various methods of treatment were tried in the hospital, including the administration of desiccated thyroid gland and Moebius' antithyroid serum, opium and bromides, but the patient continued to lose weight until he began to take one tenth of a grain of dried ox parathyroid glands four times daily. On this treatment he gained 28.5 pounds in the first nineteen days, and at the end of six months of parathyroid therapy all his symptoms cleared up, his sexual functions being restored. Once in 1913, when his pulse was faster and he was restless, he began to take one tenth of a grain of parathyroid daily, which he continued taking for four months. At this time his face became brick red, the vessels in his neck throbbed, and his throat was full. These symptoms disappeared on stopping the parathyroid, and since that time he has remained perfectly well.

**Friedman, G. A.** INFLUENCE OF PARATHYROIDECTOMY. [Jour. Med. Research, Mar., 1918.]

The writer follows up a former report with a discussion of the results of further experimentation through surgical interference with thyroid secretion. In the majority of these experimental cases there appeared lesions, erosions or acute superficial ulcers in the stomach, duodenum, and in a number of cases lesions in the appendix. He believes that the initial lesion causing peptic ulcer or appendicitis may lie therefore in a disturbance of the thyroid secretion. These ulcers did not show the same tendency to spontaneous healing as is often found in man, or in mechanically or otherwise directly introduced experimental ulcers. This he believes due to the continuance of the systemic disturbance, the decrease in thyroid secretion, by which the lesions were first produced. A slight degree of disturbance, such as often occurs in man, becomes adjusted and the lesion heals. A more severe degree, as that produced through experimental manipulation in these animals, does not allow of such healing.

The stomach was found to be in a hypotonic state, which corresponds with clinical conditions of hypotonicity accompanying peptic ulcer and appendicitis. This condition is probably due to a hypotonic condition of the vagus. The diminishing of thyroid secretion probably causes vasoconstriction and so spasm of the smallest gastric and duodenal arterioles and thus ischemia of the mucosa and superficial necrosis, and the initial lesion is produced. The ulcer occurs also in a hypertonic stomach and is probably due, like the condition of the stomach itself, to the irritability of the vagus due also to thyroid disturbance, hyperthyroidism. This results in gastric muscular spasm, which occludes the small vessels and produces in its turn ischemia and necrosis. Other endocrinous glands beside the thyroid are probably involved in the production of ulcers. Probably the causation lies with the thyroids, parathyroids and adrenals. Thus the hypotonic and hypertonic type of stomach

with peptic ulcer is probably explained by disturbance of the endocrinous glands. Treatment for this condition can therefore be left to the surgeon only as a corrective of mechanical complications. Primarily it should be directed to the systemic condition through the endocrinous glands and their innervation. [J.]

**Lunden, E.** SPURIOUS HERMAPHRODITISM. [Hygeia, June 30, 1918.]

A case report of pseudohermaphroditismus masculinus externus in which the general appearance was exquisitely feminine. The patient had consulted the author regarding a tender swelling in the left groin. This was due to a bilateral inguinal hernia. Exploration revealed absence of uterus and ovaries, while the vagina was represented by a short cul-de-sac. Incarcerated inguinal hernia of the left side contained what was apparently an ovary. The right side gave another ovary and the organs were replaced in the abdominal cavity. These bodies, however, were later recognized as testicles; and on the left side there was purulent epididymitis, as a result of which orchidectomy was performed. A "sister" of the patient was evidently an hermaphrodite of the same type, while an "aunt" showed a similar malformation. Examination was refused by these others.

**Citelli, S., and Calecti, P.** ADENOIDS AND HYPOPHYSEAL FEMINISM. [Il Policlinico, March 17, 1918. Med. Rec.]

The authors refer to an earlier study of a psychic syndrome associated with adenoid. The leading features are loss of memory, somnolence or insomnia, mental insufficiency, and inability to fix the attention. This mental picture may also be seen in nasopharyngeal tumors and sinus disease, and is believed to be associated in some way with the hypophysis. In the present article they report three cases in soldiers, one of which is as follows: Soldier, aged 25, family history negative, save that a brother, aged 21, is a mouth breather and presents psychic disturbances. Has had nasal obstruction since childhood and an abscess in the right ear. He could make no progress in school, and at 14 began work in a sulphur mine. His outside life was solitary, and he slept poorly. At the age of 20 he began his military service, which was continued into the present war. He had always seemed preoccupied, and when he received a word of command would continue to repeat it lest he forgot. He was rather indifferent to the opposite sex, and had had intercourse but a few times. Upon physical examination he presented hypotrichosis, his face being nearly smooth, with but a scanty growth in the axillæ and on the pubes. The absence of hair about the anus and on the perineum suggested the other sex. The head hair was fine and not overabundant. The texture of the skin was feminine. There was a suggestion of gynecomasty and feminine pelvis and hips. However, the frame was that of a well-developed male, including the genitals.



From a different angle the man was a typical adenoid subject, with ogival palate and crowded teeth. The temperature and pulse having been repeatedly determined, the patient was tested for a reaction to pituitrin, an injection of which determined a slight increase of both along with sweating, restlessness, headache, palpitation, etc.

**Novak, E.** INFANTILISM OF THE UTERUS. [J. A. M. A., Oct. 5, 1918.]

Infantilism of the female genital organs may be only a local manifestation of general infantilism, but more frequently it occurs in women that are apparently normal and may be unusually well developed. The clinical importance rests chiefly on its frequent association with menstrual disorders and the fact that it often seems to be the anatomic basis for sterility. Strictly speaking, the term "infantile uterus" should apply to a uterus resembling that of a child. The development of the organ, however, may be arrested in fetal life, or it may not stop until the prepuberal epoch. The distinction, however, is not practical or important, as the differences between the stages are not as great as supposed. To understand the conditions of the undeveloped uterus, one must have some idea of its embryology, and the author gives a summary of the principal characteristics at the various periods, derived from the study of the uteri of nine fetuses, and seventeen infants and children. Throughout the whole fetal epoch the preponderance of the cervix over the corpus is noteworthy, but toward the very end of this stage there is an acceleration of growth, and after birth there is a rather pronounced shrinkage or involution of the uterus, the characters of which are described. The most striking change occurs at puberty, and at 14 the characteristics of the uterus are those of the adult organ. According to the author's observations, the length of the organ increases gradually up to puberty, and the size remains about the same during infancy and childhood. The governing influences are, probably, not the same at all stages. The influence of the ovary in its development is plausibly probable, though this is disputed. There can be little doubt that the strikingly purposeful development at puberty is due to the beginning of ovarian function. The usual division of the uterus into corpus and cervix is convenient, but Novak favors the less popular plan of considering it to be made up of three segments, namely, the corpus, the cervix and the isthmus uteri. The last possesses distinctive histologic characteristics that entitle it to separate consideration, and these are significant in the explanation of certain physiologic and pathologic occurrences. The transition from the short columnar epithelium to the tall slender cervical epithelium takes place, not at the internal os, but a short distance below it. Perhaps the most characteristic feature of the isthmus is in the arrangement of its glands, which run downward and outward from uterine canal, while they run upward in both the cervix and corpus. The obstetric

importance of the isthmus is in the fact that the lower uterine segment of the parturient uterus is derived from it. Congenital flexions of the uterus probably always take place at the isthmus, and it is also probable that those occurring later in life do also. The development of all three parts of the uterus does not take place *pari passu*, but at various periods the growth predominates sometimes in one and sometimes in another. The point the author likes to emphasize in the colleges is to think of the uterus as a composite organ with three segments, varying at different periods of life. The clinical manifestations of congenital hypoplasia are, first, the menstrual symptoms, such as retarded puberty, amenorrhea or scanty menstruation which may be caused by endocrinopathies, especially the ovaries or the pituitary, or the small area of the surface of the endometrium, or defect in its physiologic function, and second, those symptoms associated with the reproductive capacity. The milder forms of hypoplasia are often associated with spasmodic severe dysmenorrhea, sometimes causing nervous breakdown. This cannot be explained with absolute certainty, and differing views have been held by various authors but its direct cause is to be sought in contractions of the uterine muscles. As to the cause of sterility, Novak finds it difficult to believe that it is altogether due to the size of the organ. If the impregnated ovum can implant itself in the fallopian tube, there would seem to be no anatomic reason for its not doing so in the uterus. It seems probable that the bar to conception must lie in the uterus and probably in its mucosa. Novak comments on methods of treatment in vogue, and it seems clear to him that while the condition is undoubtedly due to endocrine disturbance, the ductless gland that is to blame is unknown. Organotherapy of the condition is yet undeveloped. Drugs have little effect on the amenorrhea. For the relief of the dysmenorrhea, apart from the relief of pain during the attacks, atropin has been the most useful in Novak's hands. The employment of the stem pessary is not without danger, and the author sees no excuse for the plastic operations that have been devised. What has been said about the treatment of dysmenorrhea applies also to that of sterility, and here we must fall back again on disorders of the internal secretion organs and which of them causes it. To find out what these are and how to correct them is the hope of the future. The article is illustrated.

**Voelckel, E.** THE DISTURBANCES OF THE INTERNAL SECRETIONS IN EUNUCHOIDS. [Berl. kli. Woch., April 15, 1918.]

The author gives a general survey of the question of testicular insufficiency and then gives the case history of a male *æt.* forty years, with hypoplastic testes. His secondary sexual characteristics were insufficient; in height he was below the average in relation to body weight, while lymphocytosis was insufficient. Voelckel was unable to find any

change in the sympathetic or autonomous excitability. Likewise, he was able to note that the conditions of metabolism were normal by the following tests: (1) A mixed diet, at the rate of 3,000 calories by weight, maintained the subject at his normal weight. A diet of 1,800 calories resulted in a loss of weight, rapidly compensated by a return to the diet of 3,000 calories. There was, consequently, no disturbance in oxydation. (2) There was no alimentary glycosuria nor hyduria. This subject can, therefore, demonstrate either theory concerning the relationship of the endocrine glands between themselves.

**Pereira, J.** HYPOFUNCTION OF THE OVARY. [Revista de Gynecologia e d'Obstetricia do Rio de Janeiro.]

This observer asserts that the practitioner often confounds hyperfunction of the ovary with insufficiency, with the result that opotherapy is unsuccessful. He has followed up a series of cases in which insufficiency was the diagnosis, only to learn that the opposite condition prevailed. There is no such thing in pathology as a monoglandular syndrome for all endocrine syndromes are pluriglandular with predominance of one gland. He seeks to show that such syndromes are present in all of the critical periods of woman's existence—puberty, menstruation, pregnancy, puerperium and menopause. The endocrine component is associated herein with vagosympathetic components. In making a complete diagnosis it is necessary to determine the state of the sympathetic system; for in ovarian insufficiency we may see associated either vagotonia or sympathicotonia. In hyperfunction of the ovary the patient should receive extract of mammary gland.

## II. SENSORI-MOTOR NEUROLOGY

### 1. PERIPHERAL NERVES.

**Martinez, F. F.** BERI-BERI IN SPAIN. [Med. Hera., Mar. 7, 1918.]

Martinez reports a case of beri-beri in a fisherman. At first it seemed like a case of polyneuritis, but the diagnosis of beri-beri was established through the heart symptoms, cachexia and absence of malaria, alcoholic or syphilitic involvement. Moreover recovery was gradually induced through a nourishing diet other than that on which the patient had been living, particularly with avoidance of fish, rice and potatoes. Rest and massage were also employed.

**Abdou, N. T.** BERI-BERI. [J. A. M. A., Oct. 19, 1918.]

The author reports an observation of beri-beri in the sailors on a schooner from British West Africa, one of whom died the day after landing, from the acute pernicious dry form of the disease. Of the original crew of ten men only eight remained, all except the skipper suffering from beri-beri. Three of the patients had the wet or edema-

tous form of beri-beri, and complained of pain in the abdominal, epigastric, thoracic and lumbar regions, and general lassitude. The other three suffered from the dry form with similar symptoms, also muscular atrophy, slowed up reflexes, and one had, as a complication, scurvy, and another dermatitis enfoliativa. Careful treatment brought the survivors out of their trouble in thirty days. The food on the voyage consisted largely of rice, corry and salt meat for all except the captain, who had a much more liberal diet which he selfishly consumed. During treatment they were fed on fresh fruit and vegetables, milk and fresh meat.

**Hammond, T. E.** THE INVOLVEMENT OF THE EXTERNAL AND INTERNAL POPLITEAL NERVES IN LESIONS OF THE SCIATIC NERVE. [Br. M. J., April 6, 1918.]

The author observes that during the South African war the external popliteal nerve was stated to be involved nine times as frequently as the internal popliteal nerve. In injuries of the sciatic nerve during the present war the proportion is stated to be three to one. Hoffman believed it to be due to the smaller blood supply of the external popliteal; but, on the other hand, this is the smaller nerve. The fact that the internal lies more in line with the femoral vessels and that the external is the more superficial cannot account for the disproportion, as the nerves lie side by side, and bullets pass in all directions. *The external popliteal*, corresponding to the musculo-spiral nerve in the arm, supplies muscles which act against gravity. The slightest lesion of the nerve is followed by paresis of the extensor muscles, which is always evident by foot-drop and steppage gait. Great clinical experience is not necessary to make a diagnosis, and, owing to the continual overstretching of the muscles, no improvement follows until proper treatment has been applied. *The internal popliteal*, corresponding to the ulnar and median nerves in the arms, supplies the plantar flexors of the ankle, the small muscles of the foot, and sensory fibers to the skin of the heel and sole. The action of these muscles is aided by gravity. In complete division but slight deformity is usually present, and apart from inelasticity in the gait, slight inconvenience is caused; this is shown by the useful movement obtained in complete division of the sciatic after correction of the drop-foot by a suitable boot. In incomplete division slight pes cavus may be present with paresis of the flexor muscles and anesthesia, trophic changes being usually absent. Voluntary contraction of the flexors produces plantar flexion of the ankle and toes. The paresis is often difficult to observe, unless a careful examination is made, full plantar flexion of the ankle and toes being possible by the action of gravity alone, if the extensors be relaxed. It should be sought for with the patient lying prone and the knee flexed to a right angle, plantar flexion now taking place against the action of gravity. The skin of the sole and heel is not very sensitive, and to excite epicritic sensation in the normal sole slight pressure of the

cotton-wool may be necessary. The internal saphenous and the popliteal position of the external saphenous encroach on the sole of the foot and many of the ligaments are supplied by the external popliteal, and as in an incomplete lesion deep pressure sensation is often retained, the greatest care in applying the cotton-wool test is necessary.

In case of an incomplete lesion of the internal popliteal associated with a complete or incomplete lesion of the external popliteal, the flexor muscles contract with the aid of gravity, and, as they have not to overcome the normal tone of the extensors, their action may appear to be as great as usual.

Careful examination by a competent observer is necessary for the diagnosis of some of these incomplete lesions. The foot from the time of the injury is placed by the action of gravity in the position of plantar flexion, this relaxes the affected muscles and helps their recovery, even if no treatment be applied.

In lesions of the sciatic nerve admitted to Alder Hey from other hospitals, the external popliteal was affected three times as often as the internal. The greater number of the latter were admitted for the painful neuritic condition, or for the combined lesion with foot-drop.

One hundred cases, admitted direct from France, in which the wound was in the upper two thirds of the thigh, and there was a possibility of sciatic involvement, were carefully examined by me. The sciatic nerve was involved in 22.

In 4 the external and internal portions were completely involved. In 3 the external was completely and the internal incompletely involved. In 2 the internal was completely and the external incompletely involved. In 9 the external and internal were both incompletely involved. In 3 the external was alone involved. In 1 the internal was alone involved. The external popliteal was thus involved in 21 and the internal in 19 cases. In some of the latter diagnosis was only possible after a most careful examination, and in most cases the associated foot-drop alone caused inconvenience; except in the painful neuritic forms, there was a marked tendency for improvement to occur in the incomplete lesions. Incomplete lesions of the external popliteal did not show the same tendency to recover, and with the slightest paresis diagnosis was always evident owing to the inability to maintain dorsiflexion.

It may therefore be stated that for diagnosis of incomplete lesions of the internal popliteal nerve a most careful examination is necessary, especially if a lesion of the external popliteal be present. In addition, the muscles are naturally placed in the position of relaxation, and recovery follows in many cases without a diagnosis or any special treatment. Incomplete lesions of the external popliteal are always associated with foot-drop, and, as the affected muscles are overstretched, no improvement follows until a diagnosis has been made and appropriate treatment instituted. Hammond thinks that the majority of lesions of

the internal popliteal are never diagnosed, while lesions of the external popliteal are scarcely ever missed. During the examination of certain cases which could not pass the necessary tests at a command dépôt thirty-six nerve lesions were discovered by me, in spite of the fact that all cases should have been fit for general service four months after admission; thirty-five were previously undiagnosed lesions of the median and ulnar nerves, while only one was a lesion of the musculo-spiral, and this had been operated upon. Lesions of the median and ulnar nerves do not usually give rise to a deformity of a degree comparable to that present in musculo-spiral lesions. It therefore seems that even in the arm nerve lesions are more likely to be missed by inexperienced observers if marked deformity be absent; this must apply all the more to the leg, where special function of the toes is not required.

**Delagenière, H.** SURGICAL TREATMENT OF NERVE WOUNDS; OPERATIVE TECHNIQUE AND RESULTS OF 245 CASES OF SUTURE AND 113 LIBERATIONS. [*Bull. et mém. Soc. de chir. de Par.*, 1918, XLIV, 522.]

This report is based on Tinel's work in his neurological clinic. At the time of injury the nerve may be either completely sutured with the two ends in the wound, the fibers in both ends being infiltrated with blood, or the injury may be such that though physiologically the function is suspended, section is not complete. When the wound is cicatrized and the nerve is exposed, there may be any of four types of lesions: (1) compression or simple strangulation; (2) burial in a fracture canal; (3) complete or incomplete interruption by a cicatricial fibroma; (4) complete interruption by section with or without loss of substance. Every nerve wound, whether it is a perforation, notching, or section, with or without separation of its extremities is almost always a neuroma, or pseudo-neuroma. A neuroma is found on the central end; a pseudo-neuroma on the peripheral end. Both are obstacles to regeneration and must be resected and the freed axis-cylinders of both ends put in contact. In the case of sensory-motor nerves the fibers must be exactly approximated when sutured. The sensory fibers in both ends must meet in the sheaths to which they correspond, and similarly with the motor fibers. The technique is easily deduced from these general considerations. At the time of injury if the nerve is found completely or almost completely sectioned, a freshening of the ends or a slight resection followed by suture must be immediately done. Such immediate sutures give excellent results and even if they should fail, a secondary resection can be done later when the wound is healed. In a late operation after cicatrization, after disclosing the nerve a careful dissection is made above and below the site of lesion and endeavor made to find the portions above and below which correspond, so as to avoid malposition of the axis-cylinders. Minute dissection will show whether it is merely a question of compression. The neuroma of the central end and the



pseudo-neuroma of the peripheric end are searched for and resected. The diseased parts of the nerves are sectioned by fine-cutting scissors starting from the center of the lesion and progressing toward the healthy part of the nerve. Approximation of the stumps is aided by flexion of the limb. This flexion in addition to traction on the nerve, according to the author's experience, can obviate 10 cm. of shortening in the sciatic, 6 cm. in the radial, 5 for the median, and 2 to 3 for other nerves. Suture of the two ends is made by separate stitches of fine silk or linen with non-cutting needles. Four to six stitches suffice. Catgut should never be used. If the two ends cannot be approximated, recourse must be had to grafting. Musculocutaneous grafting has given the author 3 complete successes. For some time suture has been done in two stages. In a first operation as much as possible of the diseased nerve is resected but enough of the solid fibrous tissue is preserved to make a suture of these tissues. By this means a progressive elongation of the nerve is obtained. A later second resection is then made under very good conditions. The sutured nerve must be placed in tissue as normal as possible. Wrapping the nerve in pieces of artery sheath, rubber, metal, etc., are bad procedures as they isolate the nerve from living tissue and engender atrophy or resorption. The author has put the nerve in a piece of split neighboring muscle in an interstice of the aponeurosis. If the suture has been done in a flexed limb, the limb must be maintained flexed in a plaster cast from a month to six weeks. In young patients in good general condition the author finds nerve regeneration to be effected at the rate of 1 to 1.5 mm. per day after suture. In 245 cases of nerve suture and graft followed for more than two and a half years, there were 181 sutures done under good conditions with 120 excellent results, 41 fair results, and only 20 failures, or more than 80 per cent. positive results and nearly 70 per cent. excellent results. In 55 cases the suture was done under bad conditions, such as insufficient freshening of the stumps, imperfect coaptation of the fibers, or coaptation in a septic area. In these 55 cases there were 6 excellent, 18 fair results, and 31 failures.

Nerve suture, therefore, correctly made under good conditions is almost always followed by success. In this respect the author draws attention to the condition in the neurological clinic of Tinel in which the patients were under long careful post-operative supervision with the addition of every necessary after-treatment, massage, faradization, etc. This is an essential part of the successful results of nerve surgery.

In 9 cases with very large loss of substance the author used musculocutaneous grafts. There were 3 almost complete successes and 6 incomplete results. When approximation of the two separated ends is impossible, the author has never seen regeneration.

It is difficult to determine the duration of regeneration. In the radial nerve complete regeneration has been observed after four months when

the suture was early and in good condition. In the same nerve under different conditions it has required thirteen months or more.

Liberation of a nerve, except after a simple compression, always gives a functional result inferior to that obtained after resection and suture. The opinion of Tinel regarding liberations is quoted: "It is very difficult to form an opinion of the value of nerve liberations. We have done relatively few because it has seemed to us that they do not generally give better results than abstention." Delagenière says that, emboldened by the almost constant success of nerve suture, it has been the practice for the past eighteen months in severe neuritis to section and suture the nerve. The procedure has given excellent results.

**Clarke, A. V., and Spriggs, N. I. MUSCULOSPIRAL NERVE DISABILITIES.**  
[British Medical Journal, Sept. 14, 1918.]

These authors attempted to determine the most suitable position for the hand to secure the optimum relaxation of the tendons of the paralyzed muscles by careful measurements on the cadaver. The measurements were made for each individual muscle involved in musculospiral paralysis. None of the several positions commonly employed produces any relaxation of the extensor ossis metacarpi pollicis or of the extensor brevis pollicis, such relaxation being possible only by extension of the thumb and simultaneous abduction of the hand, a position impossible of attainment when the other affected muscles are relaxed. The position offering the greatest all-around advantages for prolonged maintenance is that provided by the short "cock-up" splint which leaves the thumb and fingers free for use. The long cock-up splint which supports the first phalanges is of great value for temporary use, as at night for patients wearing the short splint, as this provides perfect relaxation for the long common extensor and the long extensor of the thumb, which is imperfect with the short splint.

**Spielmeyer, W. NERVE SUTURE.** [Münch. med. Woch., Sept. 17, 1918.]

Of a total of 280 cases of nerve suture which were followed, the author selects 100 in which the postoperative time expired was not less than six months. Spielmeyer classifies the cases as follows.

	Successful.	Improvement.	Unsuccessful.
32 cases of the radial nerve .....	11	11	10
12 cases of the ulnar nerve .....	3	1	8
16 cases of the median nerve .....	4	4	8
8 cases of the superior plexus .....	2	3	3
9 cases of the peroneal nerve .....	2	4	3
2 cases of the tibial nerve .....	0	2	0
21 cases of the sciatic nerve .....	1	11	9

The writer considers as successful the return of total motricity, even if still weak in certain territories of the nerve. He notes as improvement a marked return of the functions. He likewise notes the more

favorable results obtained in suture of the radial, but the sciatic does not give such poor ultimate results as one might infer from the above table, because the number of cases noted as improved were, in reality, almost successful from the writer's viewpoint, although most American surgeons would not accept his reasoning as exact, and, all things considered, the total result, which only concerns direct suture, cannot be looked upon as joyful. Studying the histological modalities of regeneration, the writer defends his conception of proliferation and transformation of the cells of Schwann. He shows with microphotographs that total division of the nerve, followed by a cicatrix, does not of necessity constitute a permanent obstacle to regeneration. The fibrillæ force their way through the cicatrix in the most varied ways and finally end in a perfect functional recovery. A very early operation after division of a nerve is not logical, since regeneration takes place quite as well during the second three months as during the first few weeks following the injury. But the writer hastens to add that the clinical waiting time should not be prolonged beyond the lapse of six months. As to secondary operations in unsuccessful cases, the writer advises, as a general rule, to allow three years to elapse, as this time may be requisite in order to allow the results of the first operation to make themselves manifest. As to operative technique, Spielmeyer is of the opinion that actual apposition of the divided nerve is not essential. In cases of diastasis Berthe's procedure (nerve graft from a cadaver) is to be highly recommended. When a portion of nerve from a corpse cannot be had, uniting two nerves can be realized by incising the remaining intact nerve and bringing the flap over with its suture to the peripheral nerve. [Med. Rec.]

## 2. CRANIAL NERVES.

**Bard, L.** PHYSIOLOGY OF GYRATION. [Rev. med. d. l. Suisse Rom., May, 1918.]

Bard speaks of the sense of gyration as a sixth sense momentarily forgetting that there are dozens of senses—some 40 different sensory receptors being known to histology. He maintains that the gyration sense has capacities for adaptation and accommodation like those of the eye and ear. The mechanism of auditory accommodation to sounds is homologous with the differential tension of the two parts of the labyrinth, according to the distance of gyration. He very pertinently calls attention to the affective relations of sound symbols which complete the gyration images. These explain the close connection with the rhythm of sounds, the solidarity of music and dancing. The perceptions from the sense of gyration have a wide range, from cradle-rocking to seasickness. The influence of the motions of the uterus and early intrauterine impressions are also omitted by this author. The centers for gyration are sensory-motor, and those located in the cortex are closely connected with others in the cerebellum. This connection ex-

plains the nature of nystagmus, which is a double reflex action, both cerebral and cerebellar.

**Geller K., Ohm, J.** CEREBRAL CORTEX NYSTAGMUS IN A SOLDIER. [Klin. Mbl. f. Aughkl., March, 1918.]

These authors contribute to the subject of convergence cramps associated with nystagmus. They report upon a case of a countryman 30 years old, of rather weak constitution, who became ill when engaged upon dangerous work at the front in trench digging. There was high-grade tonic accommodation cramp (pseudomyopia up to 8.0 D). There were coarse horizontal movements of convergence and divergence, with alterations of the pupils and trembling of the iris which increased through fixation upon nearby objects to extremely rapid movements of the eyeball from side to side. The nystagmus yielded after some weeks to atropin, faradization and suggestion. An exact graphic of the form of the nystagmus gave as high as 1060 movements of the eyeball. There was a hypermetropia of 1.5 D after paralysis of the muscle of accommodation. The writers believe that such a convergence movement should be sharply distinguished from associated nystagmus. Its accessibility to suggestion led them to conceive that it has its origin in the cerebral cortex and Ohm thinks of it as a disturbance of the "cerebral tetanization of the eye muscles."

**Bernard, A.** MEDICAL PROBLEMS OF AVIATION. [Progres Médical, May 11, 1918.]

This general article on how to choose an aviator is of much interest. Racial aptitude, the author says, plays a factor, especially in regard to habits of sportsmanship. Analogously, the cavalry is more likely to furnish candidates than the infantry and, till recently, Germany has drawn almost entirely on the former. Good aviators are always bad sailors, on account of the development of the sense of equilibrium. The best age is from 18 to 30. Weight and height are of little importance but the height should not be less than 1.55 (about 62 inches) or the aviator will have difficulty in looking over the sides of his cradle. Deformities and surgical lesions are of indirect importance, as in affording a subsequent pretext for leaving the air service, in interfering with the solidity of the abdominal wall since the displacement of the viscera in a sudden manoeuvre leads to syncope or lypothymia. Thoracic lesions are of importance mainly as they interfere with respiration, as the oxygen is diminished by half at 5,000-6,000 meters. Anyone who cannot hold the breath at full inspiration for 45 seconds after full exhalation is unfit and most good aviators can hold the breath for a minute without discomfort. Injuries to the head are also likely to be significant, though not necessarily, by indicating cerebral change such as to cause slowness of perception, rapid fatigue, exaggerated emotional state, or sensibility

to changes in atmospheric pressure. So far as the limbs are concerned, it must be remembered that almost all motions of the aviator require the action of the arms and hands above the shoulders. Amputation of the leg may not interfere with the functions of the pilot as an artificial limb can be attached to the pedal. Limitation of ankle movements leads to assignment to a hydroplane or *aëroplane* less rapid than a chaser. Subjects who have had infantile paralysis are barred because they are predisposed to trophic troubles excited by cold.

Excessive use of tobacco, alcohol, or other drugs bars from the service, but teetotalism is not insisted on by all, though none allow tobacco or alcohol immediately before flights. Syphilis and malaria, properly treated, do not bar from service. Epilepsy, tuberculosis, bronchitis, pleurisy, asthma, do. Seasickness does not bar (nausea from test movements in the Barany chair being rather considered as an index of delicacy of the sense of equilibrium) as it is rarely encountered during flights, though some pilots vomit after landing. Sugar and albumin in the urine are positive disqualifications. All forms of cardiac disease and functional disturbance disqualify as do even conditions of unstable vascular equilibrium, Raynaud's disease for instance predisposing to frost bite.

Nervous instability as indicated by exaggerated knee jerk, tremors, insomnia and agitation must be carefully excluded, there being a special malady known as *aëroneurosis*.

Vision should be perfect, without lenses, as the latter may be broken or clouded. Some candidates with defective vision have adapted themselves and become excellent pilots. Not only must vision be perfect in the ordinary military sense but it must be perfect for both eyes together and for each separately; stereoscopic vision must be good to allow for estimating distances, color sense to distinguish insignia, signals, etc., night blindness must be excluded; larval cases of hypermetropia and astigmatism may cause bad landings.

Deafness of either ear disqualifies, not so much because the aviator depends on observation of sounds but for the very simple reason which is apt to be overlooked even by those accustomed to the use of automobiles: it is absolutely necessary that both pilots and even mechanics who do not fly shall be able to hear how the engine is working. Deviation of the nasal septum tends to bad headache on landing. Large tonsils or other causes of mouth breathing are serious as predisposing to anginas, especially from the wind of helices in front. Otitis media suppurativa, perforation of cicatrix of the drum rejects, partly because painful affections may develop from the noise of the motor or sudden changes of altitude.

Equilibration and muscular sense are highly important yet it must be admitted that the orientation depends largely on the eyes, skilled aviators often finding that in clouds, they have been flying with one wing low or have been mounting or descending without realizing it.

Graeme Anderson, bandaging his eyes, undertook to describe to the pilot, by a telephone, the changes of direction and found that while at first his descriptions were correct, he soon lost the power to orient himself. The various Barany tests and use of hot and cold water in the ears are alluded to briefly. A rough substitute for the chair is to blindfold the candidate and have him spin on one foot.

Psycho-motor tests depend largely on chronometer studies of response to various reflexes, as a revolver shot, moving needle or a touch of the head or hand. Hipp's chronoscope and d'Arsonval's chronometer are mentioned. Gemelli also has a modification. The normal response to visual stimuli is 0.19 second, retardation 0.22-0.45; to auditory 0.14, retardation 0.20-0.39; to tactile 0.14, retardation 0.20-39, these retardations being abnormal but apparently actually observed at times. Emotional tests. The aviator should not show undue reflex response to stimuli in the respiration and circulation, for obvious reasons. The test is usually made by recording the reflex from a revolver shot on drums. Tachypnea and vaso-constriction, while normal, should be of short duration. Power of observation—attention—is tested by Rossolimo's method.

The medical examination of aviators cannot be terminated by a preliminary test, however thorough, but must continue during the training period. The surgeon on duty at an aviation camp must also study the causes of every accident and try to determine methods of avoiding them, as well as develop methods for prompt medical and surgical aid. He must also study the psycho-physiologic reactions of each student, especially in regard to pulse, arterial tension, respiration and audition and equilibrium. Delicate recording apparatus is desirable. The pulse is notably accelerated up to heights of 1,000 meters, slowed from heights of 1,000 up to 1,400 meters, then again accelerated. It is accelerated by changes of momentum. In descending, it is first accelerated, then slowed. Respiration in general follows the change of frequency of the pulse but is always accelerated by altitude on account of the diminution of oxygen in a unit volume of air. Arterial tension diminishes up to 300-500 meters, then rises slowly. It is diminished in descending. In mounting, up to 1,500 meters, all the upper respiratory passages and even the ears, become congested. Relief is obtained by deep breathing and Valsalva's experiment. These troubles disappear at 4,000 meters, re-appearing on descending. More or less deafness and even bleeding from the ears occurs on landing. These troubles, due to difference in atmospheric pressure, are more pronounced if the aviator has some degree of otitic sclerosis, malformation of the nasal fossæ, etc. In mounting, Valsalva's test and in descending, Toynbee's, should be employed. Complete rest for 15-30 minutes after landing is very useful and a month's rest causes the disappearance of persistent troubles of this nature.

The causes of accident are very numerous. Defects of parts of the *aéroplane* are now rare. Stopping of the motor is no longer a cause of death if it occurs at a sufficient height so that the pilot may volplane



and choose a suitable landing place but it is dangerous at small distances from the ground and especially shortly after starting. Among 58 accidents collected by Graeme Anderson, 2 occurred in the air and 46 in landing, which is the *bete noir* of aviator students. In general accidents are due to an error in judgment or to a defect of binocular vision on the part of the pilot. Nervous fatigue, especially and quickly developed in the inexperienced, is the principal cause of "losing one's head." Thus short flights should always be enjoined at the beginning.

To provide immediate assistance in case of accident, every camp should have an observer who communicates by telephone to the surgeon on duty who has an automobile in readiness with a fully equipped surgical and medical chest. A very practical addition to this is a tool kit including cutting pincers, hammer, fire extinguisher, etc. The camp is divided into sectors with established boundaries, in order to locate accidents without delay.

**Mackenzie, G. W.** SYPHILIS OF THE INNER EAR AND EIGHTH NERVE.  
[Am. Jour. Syph., Jan., 1918.]

Earlier investigators in this province, Mackenzie says, neglected the findings in the nerve, though it seems that the syphilitic changes occurring in the middle ear are due to the extension of the syphilitic process from the meninges or nerve via the nerve or blood vessels. Very few cases are reported as invaded from the tympanic side and then it was doubtful whether a secondary pyogenic infection was not added to a syphilitic process or found fruitful soil in a syphilitic condition. Very little is known of the deafness which appears very late in the course of syphilis. From the present knowledge based upon clinical findings and pathological studies of tabes and paresis it can probably be accepted that parasyphilis is accompanied by a primary atrophy of the eighth as well as the second nerve, that this results from a preëxisting *low grade* syphilitic meningitis and that eventually the pia mater contracts and by squeezing the nerve causes its death. More pronounced syphilitic meningitis causes also a neuritis and there may be later a secondary atrophy. Parasyphilitic involvement of the central nervous system is therefore the result of a low-grade meningitis present in the active syphilitic stage.

A negative Wassermann is of but little value in these tests. More dependence is placed upon local evidences of syphilis, as in teeth and eyes, loss of deep reflexes, etc., but chiefly upon the therapeutic test, *i. e.*, toleration of mercury and KI with marked improvement on their administration. Functional hearing tests must supplement the often meager history and the otoscopic tests, which latter are misleading both as to location and pathologic character of the lesion. Otosopic evidences of middle ear catarrh are very common and may mask syphilitic conditions. The syphilitic are more prone to this affection than are others and moreover a catarrhal condition tends to excite a syphilitic

process in the region of the middle ear. Without careful functional tests, even with a striking otoscopic picture in the middle ear, the affection of the inner ear and nerve may be overlooked. The past history should not be neglected nor the Wassermann test and where warranted a careful examination of the spinal fluid from every point. Chief reliance is however upon well recognized and acceptable tests of the two functions of the inner ear, hearing and equilibration. These and their application the author then describes in considerable detail. The following findings speak strongly for syphilis: Bilateral diminution or complete loss of hearing due to a lesion of the perceiving apparatus detected by careful functional fork tests; bilateral diminution or loss of the vestibular function detected by turning, caloric and galvanic tests. Combination of the bilateral diminution or complete loss of both of these functions may be considered syphilitic as well as pronounced loss of function on only one side with but moderate diminution on the other. The hearing function as a rule suffers more than the vestibular function. The author then gives in detail the report of several such examinations. The first was a case of pronounced right inner ear and eighth nerve syphilitic involvement, in the late secondary or early tertiary stage of syphilis. The second showed a multiple neuritis involving the seventh nerve on the right side and both divisions of the eighth on both sides. There was here marked improvement through anti-syphilitic treatment. In the third case the eighth nerve did not become involved until the patient was past thirty, though the evidences were of congenital syphilis. The next case presented evidences of hereditary lues, but did not manifest itself in the ears until the forty-fourth year. Here as elsewhere the vestibular function was less involved than the hearing and responded more to treatment. Moreover there was marked improvement in both functions under KI treatment, though this was begun three and one half years after the onset of the inner ear difficulty. In this and the former case the Wassermann was negative. Middle ear catarrh had apparently been a predisposing factor here to the syphilitic process.

**Lemere, H. R.** LABYRINTH STIMULATION. [*J. A. M. A.*, Sept. 14, 1918.]

The author suggests that in the study of the application of the physiology and function of the semicircular canals, in the present interest aroused by the aviation tests, there is one method of approach that has not been used, and yet offers a promising field for investigation. That is a more careful study of the actual anatomic position of these canals and their relations to the movements of the head on the body, together with the conjugate movements of the eye. To simplify matters, he says, this subject should be considered mainly in the erect position of the body. He goes over the anatomy of the canals and the mechanics of the motions of the eyes in their relation to each other, and finds that there is a direct relationship between stimulation of the following canals

and the action of the following muscles; the superior canals and the superior and inferior recti; the horizontal canals and the internal and external recti, and the inferior canals and the obliques. Also, the horizontal canals are stimulated by the movements of the head nearly in a horizontal plane, the superior in a longitudinal plane, and the inferior in a transverse plane. The erroneous conception of the positions of those canals should be corrected and they should be called horizontal, longitudinal and transverse, respectively.

**Carpenter, E. R.** NEURO-OTOLOGIC TESTS. [J. A. M. A., Sept. 14, 1918.]

While much has been written about the Bárány tests in the examination of aviators, very little has been said about their value in other departments of army medical work. Carpenter calls attention to their application in cases subject to dizziness. He describes the anatomic relations of the vestibular organ to that of hearing in the labyrinth, and says that the soldier who complains of dizzy spells is entitled to as much consideration as one who has poor vision or deafness. Many unrecognized cases of vestibular disease have occurred and have been diagnosed as gastric disease, etc., or sometimes as hysteria. The majority of such defectives are useless as soldiers. Not all men troubled with dizziness necessarily have vestibular disease, but the significance of the assumption is so great that vestibular disturbance should be sought for. Carpenter, therefore, advises a more general use of the Bárány tests when dizziness is encountered, and closer coöperation between the otologists and neurologists in the examination of recruits.

**Callaghan, J. F.** HEARING TEST TO DETECT MALINGERING. [Bost. Med. and Surg. Rec. Jour., August 15, 1918.]

The following technique is here described to determine whether there is actual deafness in cases suspected of malingering. The basis of his test is the fact that tuning forks vibrating with the same pitch and loudness one inch from each ear are heard in each ear, but if one fork is removed to a point three inches from, let us say, the left ear this sound is lost and only the fork remaining one inch from the other ear is heard. If the latter fork is now removed six inches from the right ear, it will no longer be heard, but the left one will again become audible. Callaghan found that similar results were obtained if a tuning fork were placed against a rubber tubing and his experiments were first conducted with a stethoscope as tube. He now uses a seven-foot length of rubber tubing, hole  $\frac{3}{16}$  inch, wall of tubing  $\frac{3}{32}$  inch, to either end of which is attached an aluminium funnel. The funnels are held to the ears, and about one inch away from them, by a simple attachment on the head-rest of the examining chair which permits of adjusting them to cover the ears without touching the patient. As the test is one of air conduction, it is important that no part of the apparatus comes into contact with the patient's person at any point. Callaghan found that tuning

fork 256 C 1 was heard by the normal ear when placed against the tubing at any point up to  $7\frac{1}{2}$  feet from the ear; with a larger size tubing the fork is heard as far away as 30 feet. As a routine, however, he used the  $\frac{3}{16}$  inch,  $\frac{3}{32}$ -inch tubing mentioned. The application of the test is as follows: The 7-foot tube is connected with one funnel which is placed about one inch from the right ear. The tuning fork vibrating is applied to the tubing about 6 inches from the ear and is then moved along the tube until no longer heard. The tube is then disconnected from the right funnel and attached to the left and the same procedure followed. After this the tube is attached to both funnels; the vibrating fork is applied to the tube one foot from the right ear and moved along the tube toward the left ear. If hearing is normal, the sound will be heard only in the right ear until it reaches a point about 3 to  $3\frac{1}{2}$  feet from the right ear, at which point it will be heard also in the left ear and will continue to be heard in both ears for a distance of about 4 to 6 inches in the middle of the tube; this 4 to 6 inches the author calls the "neutral" space. Beyond this, the sound is heard only in the left ear. Callaghan points out that whereas when the tube is attached only to one ear, as in the first part of the test, the sound is heard for 7 to  $7\frac{1}{2}$  feet, when attached to the two ears, it is heard only up to 3 or  $3\frac{1}{2}$  feet, because as the tuning fork passes through the neutral space from the right to the left ear, the sound is heard only in the latter ear. As these tests are done behind the patient's back, he does not know whether one or two tubes are being used or which ear is nearer the tuning fork, and it is easily possible to detect any misstatements he may make in regard to his hearing. An 8-foot tubing may be used and may be cut about 14 inches from one end and joined by a simple wooden coupling—such as a meat skewer cut to 2 inches in length and tapered at either end—or, preferably, a coupling of hard rubber tubing. This makes it possible to determine exactly which ear is hearing the sound, as the tube can easily be uncoupled and the fork touched to one end or the other. The degree of hearing can also be determined by this test, modified as follows. Two tubes are taken, each the length of the hearing in the good ear. Funnels are attached to both ears. The fork is touched to the end of the tube connected with the good ear and at exactly the same time a fork is touched to the other tube near the head and is run down that tube. As the fork is touched further away from the bad ear the patient will cease to hear it and, if malingering, will then admit hearing for the first time. This point will be the measure of the distance he hears with the bad ear. Callaghan's test can be applied for bone conduction by the use of lugs, as the vibrations transmitted along the tubing are easily transmitted through lugs to the bony parts in the region of the ear. All that is necessary is to place the funnel in contact with the cranial bones of the ear. In applying the test the author states that he always uses a tube which is 6 inches shorter than the distance of hearing in the good ear of the patient.

**Shambaugh.** PRIMARY DISEASE OF THE LABYRINTH AND FOCAL INFECTION. [Laryngoscope, January, 1918.]

The clinical phenomena observed in cases of primary involvement of the internal ear as the result of focal infection were quite definite, although the symptoms varied more or less widely in different cases. The defect in hearing was always quite characteristic. It began as a defect in the upper part of the tone scale, while the hearing at the lower part of the tone scale remained even after the defect for the higher notes had become quite extensive. The loss of hearing might consist of a defect more or less circumscribed in the middle of the tone scale. Paracusis willisiana was never a symptom in these cases, and tinnitus aurium was seldom the annoying symptom which it so frequently was in cases of otosclerosis. In most cases both ears became involved sooner or later, the shortening of bone conduction, in such event, being always present. In one-sided involvement the positive Rinné would be changed to a negative in those cases in which the defect in hearing was quite marked. Symptoms arising from the vestibular part of the internal ear constituted a very important part of the clinical phenomena observed in many of these cases. Primary diseases of the internal ear constituted the most frequent cause of vertigo. Primary degeneration of the vestibular nerve occurred quite independently of a similar process involving the cochlear nerve. In these cases an occasional attack of vertigo was the only symptom indicating disease of the labyrinth. Three distinct types of primary degeneration in the labyrinth might be encountered: (1) where the cochlea alone was involved, producing nerve deafness and more or less tinnitus; (2) where the vestibule was involved simultaneously with the cochlea, producing, as a rule, occasional attacks of vertigo in addition to symptoms arising from disease of the cochlea; (3) where the vestibular nerve alone was affected and where all symptoms indicating disease of the labyrinth might be absent, except for possible occasional attacks of vertigo. The progress of the disease differed widely in different cases. There might be a gradual increasing degeneration of the parts involved; the progress of the degeneration might be accelerated by acute exacerbations; or the acute attacks might be followed by a long period of quiescence. Primary degeneration of the labyrinth was not infrequently a complication of syphilis, hereditary or acquired. It was also observed as a sequel of the infectious fevers, especially mumps, typhoid, measles and scarlet fever. In a large percentage of cases, however, the etiology was not accounted for. It was in these cases that focal infection was suggested as a possible cause. The similarity between the manner in which the labyrinth involvement took place and the involvement of other nerves in which focal infection was known to be the cause, suggested this conclusion.

Judd, E. S., New, G. B., and Mann, F. C. THE EFFECT OF TRAUMA UPON THE LARYNGEAL NERVES. [Ann. Surg., 1918, LXVII, 257.]

Paralyses following thyroidectomy are here studied by the authors who made a series of traumatic procedures on the recurrent laryngeals in dogs. All operations were done under ether anesthesia and sterile technique. The function of the vocal cords was observed by direct laryngoscopy without an anesthetic and the results noted without the observer knowing what operation had been performed or what his results were in previous observations. From these experiments it seems that section of the recurrent laryngeal nerve produces complete paralysis of the vocal cord of the corresponding side which in all probability is permanent. Ligation of the recurrent laryngeal nerve with linen or catgut produces complete and probably permanent paralysis of the vocal cord on the corresponding side.

Ianni, R. RESECTION OF AURICULOTEMPORAL NERVE TO ARREST PAROTID SECRETION. [Riforma Med., Sept. 14, 1918. J. A. M. A.]

Ianni reviews what has been published in Europe on this subject, and gives illustrations showing the physiologic basis of the operation. He performed the operation on a soldier with a long war wound of the parotid region that had healed except for a fistula from which saliva poured constantly. The nerve was resected through an incision the same as for ligation of the superficial temporal artery, the nerve being found just below this artery. He isolated the nerve all the way down to the parotid gland and then pulled on it and cut the central end. He thus succeeded in isolating a tract 4.5 cm. long, with the small glandular secretory ramifications. The saliva still poured from the fistula for a few days, but by the seventh day the fistula had completely healed, and no saliva issued from the mouth of the duct of Steno. The cure has been complete during the nearly two years to date. None of the persons who have been operated on by this technique experience any inconvenience from the loss of the parotid secretion, the other glands furnishing abundance of saliva.

### III. NEUROSES, PSYCHONEUROSES, PSYCHOSES.

#### 2. PSYCHOSES.

Bleuler, E. MENDELIANISM IN PSYCHOSES, ESPECIALLY IN SCHIZOPHRENIA. [Schweiz. Arch. f. Neur. u. Psych., Vol. I., No. 1.]

Bleuler refers to Rüdín's recent study of heredity in the psychoses from the Mendelian standpoint as an establishment of a technical mathematical conclusion but hardly wide and flexible enough for shedding real light upon the problems of the psychoses, particularly schizophrenia. Though he has set some new viewpoints before the clinician, which may be profitably followed out, yet the study is too strictly statistical



and does not comprehend widely enough the large number of members of the family who, though they fall into the same hereditary groups, are not among the sick members who come to the physician's attention. Moreover the relationship between different diseases is not sufficiently taken into account. According to Rüdin's findings a manifest schizophrenia cannot be a monohybrid mendelian sign. The scarcity of cases of direct inheritance do not permit us to consider it a dominant trait and the "healthy" parents of schizophrenic children must be recessive heterozygotes and 25 per cent. of the children would have to be ill if this were a simple recessive phenomenon. It might be possible that schizophrenia is a dihybrid, the product of two characters, that two latent characteristics appear in the descendants, some of which however, as light cases, escape notice.

In spite of the insufficiency of Rüdin's material certain interesting facts appear. Dementia præcox, for example, as he defines it, is found associated with other psychoses and with alcoholism, in fact the schizophrenic constitution is hardly more closely associated with the origin of dementia præcox than are other psychopathic factors taken together. From Rüdin's statistics various other factors enter in to produce schizophrenia, from which a polymorphous inheritance cannot be excluded. There is a great variety of psychoses which appear in the families of schizophrenics.

Rüdin used his method of study upon dementia præcox because he believed that this psychosis was most easily demonstrable. Bleuler himself is of an opposite opinion because dementia præcox is far more prevalent than would be seen merely from the pronounced cases to be found in institutions, from which Rüdin made his studies. Experience teaches that many doubtful psychoses, or psychoses otherwise diagnosed, also often those first considered only neuroses or psychopathies, are later clearly recognized as dementia præcox. Besides certain outer events or misfortunes sometimes precipitate a latent schizophrenia which might otherwise pass undiscovered. We cannot therefore be sure in how many persons the germ of the disease lies undiscovered. In fact dementia præcox and other psychoses, without observations upon animals and plants, would have been sufficient to convince us of the mendelian theory, a theory of an intermediate inheritance, an inheritance with countless degrees and variations in relation to the intensity of the disease. The facts give us no justification to call that a special disease which merely stands out a little from the countless other cases through accidental causes or a somewhat greater intensity in a continuous series of qualitatively similar phenomena. Manifestations may differ in different environments but such evidence of social inadaptability does not measure the biological limits of the disease, these being much wider than that set by the observed cases of dementia præcox. Of the real limits of dementia præcox we are yet very much in the dark. We do not know how marked must be any individual symptom or the entire picture in order to call it a sure sign of the disease, nor can we on account of

the latency of the disease entirely, in a given case, rule out a possible schizophrenia. Probably the schizophrenics outside of institutions are more numerous than those confined.

The enlargement of the conception of schizophrenia would reverse the relationship of this condition to other psychoses and various anomalies which are so often found in families of schizophrenics. The manic-depressive insanity most of all must content itself with a much less important rôle. The connection of schizophrenia with other psychoses and neuroses does not mean a di- or polyhybridism but more correctly a wider conception of schizophrenia. It seems most apparent to Bleuler that an appreciable number of other psychoses are genetically identical with dementia præcox. If one parent is mentally ill but yet "not schizophrenic" still the schizophrenic offspring are about as numerous as those otherwise psychically ill, and with both parents psychically ill but not schizophrenic, it has been found in ten families that the schizophrenic offspring were 22.72 per cent., while other psychoses were not present.

Experience proves that doubtful cases are more likely correctly assigned to the dementia præcox group than not. The wider concept will permit us to find homozygote parents with a schizophrenia which has been overlooked and who have been looked upon as heterozygotes, and under those apparently untainted homozygotes, latent heterozygotes.

On the other hand studies in heredity must assist the difficult task of finding the boundaries of the whole schizophrenic group. One family investigated by Minkowska in several hundred members shows that the family inheritance manifests itself from time to time in certain clinical mixed cases between manic-depressive insanity and schizophrenia. In many families there are disease forms similar to one another qualitatively and quantitatively, which can hardly be accidental, while on the other hand there may be schizophrenic patients of most different forms among close relatives. The same relation between schizophrenia and epilepsy manifests itself.

The question is what is it that is inherited? Although not definitely demonstrated it is generally accepted that there is a congenital anlage which plays a large part. Does this lead to definite manifestations at a certain age or depending on definite external factors, representing the reaction of a predisposed psyche to various traumata? Of course, Bleuler says, a latent schizophrenia is already a psychosis though not yet evident to those about. The previous history of a manifest case very frequently, if not always, reveals early anomalies of a definite trend, and it is to be considered whether they are the early illness or merely indications of the anlage. Are there outer or inner causes which bring these to a fully developed psychosis? We have at any rate to distinguish between the manifest disease and the inherited anomaly. In paranoia, hysteria and other examples there is the anlage toward life's difficulties, the disposition toward any such reaction, which is inherited. The reaction itself is not inherited and under favorable circumstances it

may be escaped. These "secondary symptoms" as the author calls them, hallucinatory content, delusional twilight states, etc., are not inherited, but a common inheritance under similar conditions can manifest itself in a similar manner. Primary symptoms, certain somatic symptoms in dementia præcox, like trembling, associational disturbance, etc., perhaps express the inherited anomaly. We know as yet too little of these symptoms to determine this. It is most likely that the primary symptoms do not represent the inherited anomaly itself but are the phenomena which are nearest to it, behind which again are anatomic changes, chemical anomalies. The inherited schism as well as the manifest one has to be sought. This may not be directly psychical, but anatomical, chemical or neurological. Both outer and inner influences can bring an already existing psychic abnormality to full development or join themselves to the developing condition. For example a certain sensitiveness can interfere with the individual's adaptability and so hasten the outbreak of the disease. This explains the relation of schizophrenia to other psychoses, to alcoholism, etc. This would not be the same as a polyhybrid genesis of the schizophrenia. The frequency of other psychoses among the relatives can have various grounds, never one cause alone. These psychoses represent components or combinations of such components which in other groupings constitute dementia præcox. The infrequency of schizophrenics among step-brothers and sisters speaks against its being a monohybrid sign.

Many questions arise as to the relation of the disease symptoms with the inherited factors and as to the various possible combinations of inherited traits, if schizophrenia represents a di- or polyhybrid inheritance. Environment has also to be variously considered. It may determine the occurrence and the form of an outbreak or may serve to hinder it. The gradations of the disease may lie in the grade of heredity or in external causes. It is necessary also to bear in mind the traits which point to a future outbreak of the schizophrenia, and this must take account not only of the specific inherited tendencies but also of accompanying phenomena which condition or favor the outbreak of the illness.

A study like Rüdin's can be valuable only in a well defined conception of dementia præcox, either as one form of manifestation or we must know all the other clinical pictures which must be taken into consideration. The causal connection between inherited psychosis and the manifest psychosis must be known. There must be surer diagnosis and if the illness is recessive all the homozygote cases must be manifestly schizophrenic. Dominant and recessive homozygotes must be distinguished from heterozygotes. External relationships which make it possible to discover other patients in any family under investigation must be considered. Inheritance is not dependent upon sex. The mortality of the various forms must be determined. There can be no change in dominance. If environmental influence could make any great difference in the numbers it must be taken into account qualitatively and quantitatively. The disease could reproduce itself neither through

outer influences nor through mutation or similar processes. Some of these conditions fail in dementia præcox, and of the last we have no knowledge. The others may hold. It is by taking account of many factors which interplay that light will come upon them all. There is needed an exact research into individual families in the broadest sense in all the characteristics of the individual members. This must include the sound as well as the diseased, the former being in some cases of as much importance in heredity as the psychotic, and every form of psychosis or other abnormality. Such a study would have to be undertaken by more than one investigator.

Some of the questions roused by Rüdin's study are of the relation between dementia præcox and alcoholism, of mortality and elimination of the disease, if the mortality is high and the disease militates against marriage and reproduction, why it still reappears? The question of the morbidity of the later brothers and sisters needs still more investigation, and how far the answer to it depends upon environment and how far upon later birth. The question of a real dominant inheritance is therefore so far, with so many difficulties in the material, an open one.

Rüdin's investigations, Bleuler says in conclusion, give a certain answer to some of the questions but are not enough. We do not yet know what it is that is inherited. This hides itself in other manifestations than the evident final disease, which depends for its appearance upon a long chain of intervening causal factors. Whether the inheritance of mental disease is a simple or manifold one we do not know. A wider conception, embracing latent or otherwise manifest anomalies along with the manifest schizophrenia would essentially modify these results. The conception of the heredity would be a wider one while the limitation of the one form of psychosis would be more sharply defined in relation to heredity. The evident relation of schizophrenia to other psychoses and to alcoholism reveals not only a polyhybrid genesis of the disease but in such a way that various other determinants must be added to that specific one for schizophrenia in order to create the disease. Different participating factors would then be equivalent hybrids. Not only  $xy$  but  $xz$ ,  $xt$ ,  $zn$  could produce the disease. Future investigation must occupy itself with entire family groups, sound and diseased members, those manifesting the burden of heredity or those more fortunate. [Jelliffe.]

**Porot, A., and Gutmann, R.** MALARIAL PSYCHOSES. [Paris Méd., March 30, 1918.]

Malaria has become much more frequent during the war and the authors have had opportunity to differentiate three types of acute malarial psychoses and four chronic forms. Vigorous and persevering treatment by quinine is most efficacious in warding off the chronic forms.

**Damaye, H.** WAR DEPRESSIONS. [Prog. Med., Aug. 17, 1918.]

Thirty-three of about 1,000 patients passing through one psychiatric center had tried to commit suicide. In fifteen there were indications of cardiac disease. The mental disturbance was most often manifested by desertion. Malaria plus alcohol was found in the large majority of these cases. Many were extremely susceptible to alcohol, one glass of wine being badly borne. Fatigue enhances his susceptibility.

**Pillsbury, L. B.** THE PERSONAL EQUATION IN PSYCHIATRY. [J. A. M. A., July 20, 1918.]

The author says that in one sense of the term personality may be said to be everything in insanity. The hardest things to extinguish in an individual are the things that mark him off from others. The author asks, Can personality be of etiologic significance in the determination of insanity? It can be, he says, if by personality we mean that individual set or bias which creates a presumption in favor of either normality or abnormality in reaction to difficult circumstances, but an adequate definition of personality is practically impossible. It is made up largely of habitual modes of thinking, feeling and acting. We cannot but be impressed by the tyranny of personality when we compare the intracentric and subjective precocious dement with the exocentric and objective maniac, but after all we cannot tell which component in the etiology has the greater effect in determining the psychosis, whether the personal make up or the hypothetic disturbing factor. It is often plausibly said there is nothing remarkable about certain persons becoming insane because they seemed always on the verge of it, and its manifestation was only an exaggeration of existing traits or tendencies. The idea of effect without cause is abhorrent and a rational dualism seems to extricate us from the dilemma with which we are confronted, if we assume that physical injury or disease can cause only physical disorder and that insanity, therefore, is purely psychologic in origin. It is astonishing how much disease of the brain may sometimes exist without mental breakdown. We prefer to think of a man as something more than a mere mass of biologic adaptations, but we must not lose sight of the fact that perhaps the greatest progress of modern psychiatry is to be found in the biologic aspect of the disease, and probably the psychiatrist will succeed best by keeping all the elements, bodily and psychic, in mind.

**Damaye, H.** EPILEPSY, HYSTERIA AND CHOREA IN ADVANCED PSYCHIATRIC CENTER. [Prog. Med., Sept. 14, 1918. J. A. M. A.]

Damaye gives some examples of convulsions resembling epileptic seizures which developed after exceptional physical exertion, long day and night marching or manual labor. A very little alcohol, then, may be the last straw that brings on the convulsion. The effect of a wound or bombardment or getting gassed may also have this effect. Epileptics

average as high in courage as others, other things being equal. They are not infrequently cited for gallantry. Some do heroic acts in a kind of impulsive manner like that in which they sometimes commit criminal actions. Some epileptics display symptoms resembling those of neurasthenia, and some who have been trephined present, in addition to all this, attacks of jacksonian epilepsy. In treatment, a quiet environment, sodium cacodylate and a milk-vegetable diet were the main reliance. In the great majority of the cases the epilepsy dated from early life but had been aggravated by campaign conditions.

**Singer, H. D.** MENTAL HYGIENE. [J. A. M. A., July 20, 1918.]

Singer says that mental hygiene is too much a closed book to the general practitioner and that training in this special line is neglected. The usual notion, he thinks, is that a healthy body is all that is necessary for healthy mentality. The fallacy of this view has been strongly emphasized by the results of examinations and experience in the formation of our new army. While it is not probable that obvious defects have been overlooked in the accepted cases, over 1 per cent. of those passed have been later found unfit because of some mental or nervous deficiency. Military training is not altogether physical, and he asks, is there not even more need of training in mental adjustments. The morale and *esprit de corps* of a good soldier and the general need of discipline and self control may be even more essential. Singer says: "Let us consider for a moment the factors involved in the consideration of mental adjustments. These may be divided under the two heads of (1) quantity, (2) quality. The former is structural; the latter functional." The best that we can do at present to meet the former is try to ascertain the brain tissue available and train it in a right direction. The tests are being constantly evolved and their application is simple. The quality, on the other hand, represents the use which is made of the available tools, and how far this is due to hereditary causes and to subsequent training and education is unknown. Whatever may be the true relation between these two causative factors, training and habits are far more readily open to interference than heredity. But we must first answer certain questions, namely: "1. What constitutes a healthy or satisfactory adjustment? 2. What are the indications of a liability to fail? 3. What measures must be taken to remedy or minimize these faulty tendencies?" These questions cannot be answered with absolute certainty. The first requires the consideration of the following: How far has the individual learned to observe the rules for the regulation of conduct which have been gradually evolved in civilized society to the restraint if necessary of his biologic desires. Singer brings in as an illustration the development of a war neurosis in the patient as the result of finding himself in an intolerable position through his war environment, a condition he would not have to face in ordinary civilized life. Proper hygienic study of such cases may lead to their prevention. As an answer to the third question, the methods to be followed, the author says, are similar in kind



to those adopted in the ordinary methods used today for the treatment of war neuroses. They concern education, the development of interests and habits, and have nothing to do with punishment. The necessity of the medical practitioner giving his attention to these matters cannot be questioned, while expert knowledge and direction are also essential. The state should provide the means for this training of the physician, and the coöperation of local physicians is also essential. Our medical colleges have so far only partially met the needs of mental hygiene. Their courses on its subjects are brief and insufficient. If this war brings prominently to the fore the importance of mental health to national efficiency it will have accomplished an inestimable benefit.

**Uhlman.** MOBILIZATION PSYCHOSES IN THE SWISS ARMY. [Med. Rec., June 22, 1918. Ed. from Correspond. bl. f. Sch. Aer.]

This author refers to the well-known fact that at the outbreak of a war there is a general alteration in the psyche of the entire community and an increase of psychic morbidity in both the military and civilian population. A contingent of psychoses also follows mobilization of an army even in peace times. The Swiss troops were mobilized at the outbreak of the present war and the author by communicating with the heads of the insane asylums obtained data as to the number of psychoses during and for several months following mobilization which were the direct result of the latter. There is of course no one cause for war psychoses but the content tends to have a military coloring and the type of the mental alteration is severe. Fear effects are common—a man fears that he will be thought a spy or traitor or deserter and expects to be shot.

In the first ten days of August about 250,000 troops were called out and 32 were evacuated to insane asylums. From August 1 to December 31 the total number of such evacuations was 151. In other words, the reaction due to mobilization was soon followed by equilibrium. Monthly figures show a steady decline and a curve for the five months' period shows a sharp rise which culminates August 10 and is followed by a short sudden and a long gradual fall. Among the mobilization psychoses those due to alcohol are always well represented and of the 151 cases 35 were of this origin. The proportion is especially high in the older men of the landwehr and landsturm—12 cases out of 39. The proportion of alcohol psychoses in the marching troops was 20 per cent. It would, however, be unfair to regard all such cases as examples of delirium tremens for subjects with endogenous psychoses may drink to excess. It is almost certain that some of these cases should be credited to dementia præcox. All of these alcohol psychoses were chronic. The author has no single classification of dementia præcox and follows the asylum diagnoses, which evidently are not patterned throughout on Kraepelin's classification. We find 61 cases of dementia variously termed katatonic, hallucinatory, paranoid, and hebephrenic, which doubtless jointly answer to dementia præcox, and adding the 35 alcoholics

obtain a figure that represents two thirds of all the mobilization psychoses. Others are as follows: Manic depressive insanity, 7; melancholia, 3; exhaustion psychoses, 2; paranoia, 1; progressive paresis, 1. In addition to psychoses proper there were 8 imbeciles and a number of psychopathic and psychoneurotic subjects, comprising 16 with the simple diagnosis of psychopathy, 8 cases of hysteria exclusive of 2 somnambulists and 6 epileptics. There were 2 deaths exclusive of suicides. There were from 25 to 30 suicides during the five months' period but the relationship of insanity is not made clear. In about a third of the 151 cases there was an hereditary taint.

**Bailey, P.** PSYCHOSES AND MILITARY SERVICE. [Mental Hygiene, July, 1918.]

Does Army life make men insane? The question is especially important in a warfare which involves the whole nation as bearing on the economic value of psychiatric examinations. Bailey, as abstracted in the "J. A. M. A.," says, that so far as epilepsy and mental deficiency are concerned, the present statistics do not throw much light. While camp conditions might easily, and as a matter of fact often do, give rise to nervous episodes in the mentally deficient, they have nothing to do with the underlying cause. The same may be said of epilepsy. The frequency of attacks in epileptics may be increased after entering the Army, but figures so far obtained do not justify the assumption that a potential epileptic under peace conditions is converted into an actual one by Army life. But the matter is quite different with the psychoneuroses, constitutional psychopathic states and dementia præcox. It seems that even in the training camps any of these conditions may become active and conspicuous through the requirements of military service when they had not manifested themselves to a degree to be incapacitating in civil life. It is not believed that this conversion of a potential psychosis into an actual one in the camps is a result of hardship or physical causes. It is believed rather to be a psychologic result from disharmony with new and rigid conditions which the neurotic, who is so intensely individualistic, finds it impossible to adapt himself to and so breaks down. This explanation holds true for those who have volunteered quite as much as for those who have been drafted. So far as the expeditionary forces are concerned, the time has not yet come to explain the method of production of psychoses. Most of the wounded so far returned had departed for France before the neuropsychiatric examinations had been established. Among them there is a percentage of nervous and mental disease of twenty-five, a percentage that seems destined to decrease as the figures more and more concern the examined Army. Experience indicates that a pronounced psychopathic constitution and military service are antagonistic. It is believed, on the other hand, that psychoneurotics who might render excellent service in their civil capacity, become incapacitated by the change in their habits of living however patriotically

they may have sought it. It is also believed that the Army fares better without them.

**Southard, E. E.** MENTAL DISEASES. [J. A. M. A., Oct. 19, 1918.]

Speaking first of the lack of knowledge of the average practitioner in regard to insanity in its various forms, Southard says that the general practitioner has become responsible in these matters far more than his predecessor had to be. The establishment of psychopathic hospitals and wards and of societies for mental hygiene is a sign of the appreciation of the needs. What ought the general practitioner to do to better his knowledge with his previous meager training along these lines? There is little in the medical school memories of most men to inform them. He proposes that all general practitioners who feel at a loss how practically to use the relics of their psychiatric training should as soon as possible spend at least a week in contact with the clinical material of some one of the institutions like the Ann Arbor psychopathic ward or the clinics of Boston or Baltimore which have contact with the class of cases the general practitioner is likely to meet. Sketching the main features of the psychiatric landscape, as Southard calls it, the general practitioner ought first to become something of a psychiatrist, and not try at once to be an alienist, and he draws the line of distinction between the two. The alienist's field is insanity in its public, governmental, and legal relations in settling the questions of sanity versus insanity, the latter implying mental disease, while a psychiatrist should consider the whole field of mental disorder and its border lines. There is no doubt that the general practitioner ought to know as much about psychiatry as he is expected to know about sixteen or seventeen other practical specialties in which a fine capacity for diagnosis and the minutiae of the conditions is not expected of him. Southard has recently gone over the text-books and main classifications of American institutions for the insane, and has tried to put some order into the matter by dividing the mental diseases into eleven groups, giving the everyday terms used for each on the one hand and on the other the revised and Hellenized nomenclature which he thinks has some worth. This part of his paper is too elaborate in some respects to be adequately summarized. A few points may be mentioned. He believes that the use of the term *dementia præcox* has been prejudicial to the interests of the patient, and he prefers to call the combinations of symptoms thus designated *schizophrenias*, and with the psychoneuroses which are apt to be considered largely imaginary by the practitioner whose ideas are more or less vague on the subject and false diagnoses are liable to occur. *Schizophrenia* and *cyclothymia* represent a class of which the general practitioner should try to form more adequate ideas. He should try to bring himself up to the times in regard to these groups. Southard does not argue in detail for the use of the term *cyclothymia* instead of *manic-depressive psychosis*, but he thinks it has its advantages. He gives a very extended list of the subdivisions of his eleven forms or groups of insanity and has tried to classify sys-

tematically the varieties within each group. He sums up his conclusions as follows: "1. The advance of the mental hygiene movement throws more responsibilities in psychiatric diagnosis on the general practitioner. 2. The general practitioner should bring his specialistic knowledge of psychiatry up level with his specialistic knowledge, in ophthalmology and dermatology, for example. 3. Alienists are to be distinguished from psychiatrists, and forensic psychiatry ('alienists') from practical psychiatry, in certain ways. 4. There is at present great unanimity on the part of American specialists in mental disease, as indicated by the adoption of common statistical forms (American Medico-Psychological Association). 5. For arriving at a diagnosis of mental disease, I suggest an arbitrary order of exclusion by eleven great groups, into which I have thrown the accepted entities. 6. Nomenclatural divergences are much more frequent than divergences on facts. 7. The use of Bleuler's term 'schizophrenia' for dementia præcox and of the term (in cognate use) 'cyclothymia' for manic-depressive psychosis is advocated in the line of exactitude and the ready formation of adjectives and relative terms. 8. The use of a new term 'hypophrenia' for the various feeble-mindednesses is advocated. 9. The ending '*osis*' is in general advocated for the larger groups of mental diseases, parallel with the use of '*aceæ*' and '*osæ*' for botanical orders. 10. A tentative list of 'genera' under these orders is given in the text."

#### IV. FORENSIC PSYCHIATRY

**Ely, Frank A.** THE PATHOLOGICAL LIAR. [Chicago Med. Recorder, 1917, XXXIX, Nov., p. 502.]

"The pathological liar is a social misfit whose mental defects cannot be detected by the Binet-Simon tests alone, and yet, when subjected to more technical psychological investigation and when judged by the character of their anti-social conduct, may be quite definitely classified as sub-normal." Healy's definition is given: "Pathological lying is falsification entirely disproportionate to any discernible end in view, engaged in by a person who, at the time of observation, cannot definitely be declared insane, feeble-minded, or epileptic. Such lying rarely, if ever, centers about a single event; although exhibited in very occasional cases for a short time, it manifests itself most frequently by far over a period of years, or even a life-time. It represents a trait rather than an episode. Extensive, very complicated fabrications may be evolved. This has led to synonyms: mythomania; pseudologia phantastica."

Ely's case was a typical one in a woman of twenty-four. The real facts of her history, which she falsified, were these: She is the illegitimate child of an actress of whom little is known. Very early in life she was adopted or cared for by a loose woman who, according to the patient, introduced her to her own mode of life. She ran away from this woman, and, as far as can be found out, lived a hand-to-mouth life

for some months, during which time she is said to have given herself up to prostitution and irregular sexual practices. Later she was confined in some detention home, the character of which is unknown. Her education was almost nil, possibly not higher than the finished fourth grade. In 1916 she was taken into a home for fallen girls. While there, she alternated between angelic and satanic moods. She gave evidence of auto-erotic and homosexual irregularities. All her stories tended towards the most excessively fanciful fabrications. She claimed great skill in music and art, but really knew nothing about them. She showed no physical defects nor stigmata of degeneration. She was friendly, easily approached, and coöperated well with the physician. She showed extraordinary linguistic ability, was plausible, and emotionally unstable. On account of her sexual perversions she had to be removed to another home. Ely sums up the peculiar and dominant features of the case thus: (1) Bad heredity; (2) bad environment, including bad sex training; (3) very deficient school training; (4) serious sex delinquencies; (5) unusual linguistic ability out of all proportion to her training and education; (6) fantastic, imaginative, uncalled for fabrication without adequate motive; (7) desire to play with children and tell them stories (one of the definite characteristics of the pathological liar); (8) great emotional instability; (9) poor memory for exact repetitions; (10) native ability and planfulness above the average; (11) inability to conduct herself and her affairs with reasonable prudence because of abnormal sexuality, changeability of moods, and excessive lying; (12) total absence of self-control with respect to sex matters; (13) only a false or superficial understanding of her moral responsibility.

**Osnato, Michael.** MORPHINE POISONING. [J. A. M. A., June 15, 1918.]

Osnato reports a well advanced case of tabes in the paralytic stage. The patient was mentally depressed. The general neurologic examination revealed sluggish irregular pupils, good consensual action, decided ataxia, absent patellar and ankle reaction as well as Babinski reflex, but with deep reflexes of the upper extremities fairly active. There was no clonus, atrophy or tremor, but there were several areas of anesthetics; and various paresthesias and dyesthesias had been found in both feet, particularly on the plantar surfaces. Blood pressure was between 120 and 130 (systolic). Heart and lungs were normal, and the arteriosclerotic changes were singularly absent. The patient took surreptitiously eight  $\frac{1}{4}$ -grain tablets of morphine, and in about an hour, he was unconscious, cyanotic, dyspneic and apparently dangerously ill. The heart rate went from 140 to 176 within a half hour, and after that became intermittent. Later, Cheyne-Stokes breathing appeared, and the patient was in coma, and could not be roused. The patient was examined by Osnato about three hours after taking the morphine, and was found in the condition described, but breathing quietly and regularly

with an occasional pause of four to ten seconds. There was extreme muscular flaccidity, which could not be entirely accounted for by tabes. The cranial nerves seemed to be functioning properly, and there was no demonstrable facial palsy, and the patient was in coma. "The consensual reaction was absent on repeated testing. The reflexes in the upper extremity were fairly active and equal. The patellar, ankle and dorso-cuboidal reflexes were absent. The abdominal reflexes were peculiarly inconstant. At the first examination of the evening it was almost impossible to get more than a very slight flicker from the abdominals on the left side; later, these became very active; the reflexes on the right side could not be obtained. Still later, all the superficial reflexes except the lower right abdominals were active. Most surprising was the definite presence of a well marked Babinski response on the right side which was demonstrated time and again, and which was produced at each stimulation at least eight or nine times. On the left side we obtained a doubtful Babinski response on three or four occasions. The Oppenheim reflex on the left side was surely present; on the right side, this abnormal reflex, together with a Chaddock and Shaffer reflex, was present. No Gordon reflex could be elicited on either side. There was also present at each application of the test a Klippel-Weil reflex on the right side only. Here, too, there was present the pronation sign of Strümpell. The sign of Marie-Foix was absent. The patient's muscles were extremely flaccid. There were twitchings and convulsive movements of the legs and right upper extremity. The rest of the neurologic examination was negative. The heart beat was 136 and regular. There was brachycardia. The blood pressure was 80 systolic, and the diastolic pressure could not be obtained. A few hours later the blood pressure had fallen to 75 systolic. The face was not suffused or cyanotic, and the breathing was not stertorous. The skin was warm and dry, the temperature 97." No suspicion of morphine poisoning had been aroused, and the patient was considered as dying from cerebral hemorrhage. It seems to Osnato that there may be two physiologic actions of morphine, a depressant and a stimulant one on the spinal reflexes, and the case may be of use in throwing light on this conception of morphine action on the brain and spinal cord. The patient, subsequently, improved and within twenty-four hours had returned to the condition he had been in before the morphine poisoning.

**Smith, R. P.** APHASIA IN RELATION TO MENTAL DISEASE. [J. Ment. Sc., 1918.]

Smith reports a series of facts as a contribution to the knowledge of aphasia and its association or not with other mental disorder, as well as the business or testamentary significance of its presence. Among some forty-five cases seen by the author the average age of the male patients was 57.6, but excluding the syphilitic cases it was 62. In the



syphilitic cases alone the average age was 47. Among the women there was no syphilis and the average age was 62. Twenty-six per cent. of the men and 22 per cent. of the women showed definite heart disease, either valvular or degenerative. Renal disease was present in the men in the same proportion and in about 11 per cent. of the women. Arteriosclerosis was present in 26.6 per cent. of the men, nearly 17 per cent. of the women. Twenty-six per cent. of the men gave a history of alcoholism and nearly 17 per cent. of the women. Sometimes these various factors were found in combination. Definite hemiplegia was present in 19 out of 27 of the men and in 10 out of 18 women. The hemiplegia immediately associated with the aphasia was always on the right side. Family history of insanity, neuroses or alcoholism was found in 33 per cent. of the men, 39 per cent. of the women. In one family there had been two deaths from right hemiplegia with aphasia. In three cases there had been previous attacks of insanity and in many there was mental disorder or failure preceded the onset of aphasia.

Smith divides his cases into four groups: Those in which mental disorder or failure, or dementia preceded definite aphasia; those in which considerable mental failure occurred with the attack or subsequent to it; those with whom there was severe speech disorder but a degree of mental capacity permitting of business or testamentary ability; those in which speech disorder and other mental disorder are both slight. He does not believe from the examination of the cases, a number of which he reports, that the disorder of mind exhibited in the aphasia can be associated only with a lesion of a single center of intellect specialized for language but that it is associated with widespread vascular and nutritive changes in the brain, such as are commonly present in senile and syphilitic cases. Thus aphasia may supervene on a preëxisting mental and cerebral deterioration or it may be the initial symptom of such decay.

PUBLIC POLICY WITH REGARD TO MARRIAGE OF EPILEPTICS. [Kitzman v. Kitman et al. (Wis.), 166 N. W. R. 789. J. A. M. A., 1918, XII, p. 1854.]

The Supreme Court of Wisconsin holds that where, on Sept. 27, 1915, a man and a woman went from Wisconsin to St. Paul, Minn., there obtained a license to marry, and before a justice of the peace in the state of Minnesota had a marriage ceremony performed, receiving from the justice a marriage certificate in the proper form, and returning on the same day to Wisconsin, where they thereafter lived together as husband and wife, a judgment of a circuit court in Wisconsin confirming the marriage, in a suit brought therefor by the woman, must be reversed, with instructions to the circuit court to enter judgment declaring the marriage ceremony null and void, one of the findings of that court being that during the period of ten years preceding the trial the man

had been subject to occasional attacks of epilepsy, which epileptic condition was caused by the excessive use of alcohol. The court says that the marriage in Minnesota was solemnized contrary to the express prohibition of the statutes of that state and contrary to its public policy. It was solemnized there after a fraud on the clerk of the district court, in his duty to ascertain and to be satisfied that there was no legal impediment to such marriage, had been perpetrated either by the concealment by or false statement of the man as to his condition on a material and statutory requirement. It could not properly be held that the public policy of Minnesota, in prohibiting an epileptic from contracting a lawful marriage, was contrary or repugnant to the then public policy of the state of Wisconsin, inasmuch as this state then prohibited the marriage of insane persons and idiots; for, although there is a distinction both in the legal and medical sciences between epilepsy and insanity, yet the court may properly take judicial notice that epilepsy is a serious mental disease, and tends to weaken the power of the afflicted person and to injure his posterity. This court would be loath to declare, if not indeed prevented from declaring, that such a prohibition by Minnesota was contrary to the public policy of Wisconsin, in view of the fact that by Chapter 218, Laws of 1917, the legislature amended Section 2330 of the Wisconsin Statutes by inserting the word "epileptic" between the words "person" and "or," where the provision was made that "no insane person or idiot shall be capable of contracting marriage." The marriage ceremony, therefore, which the plaintiff asked the courts of Wisconsin to confirm in this action, was, where performed, contrary to public policy of the state resorted to by the plaintiff for the sole purpose of performing the ceremony, and this court will give it no higher value in Wisconsin than it had there. The mere fact that the unfortunate man, when examined as a witness in the court below, expressed himself as opposed to the action taken by his guardian in asking that the complaint be dismissed and the alleged marriage be declared void, and indicated his desire of having the marriage ceremony confirmed, and the relationship continued, did not alter the situation nor change the duty of the court in disposing of the case. The state has the right to control and regulate by reasonable laws the marriage relationship of its citizens, and the wishes and desires or even immediate welfare of the individual must yield to that of the public welfare as determined by the public policy of the state.

## Book Reviews

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**Southard, E. E., and Solomon, H. C.** NEUROSYPHILIS. Modern Systematic Diagnosis and Treatment. Presented in One Hundred and Thirty-Seven Case Histories. W. M. Leonard, Boston.

Three distinct tendencies are at work in the scientific field at the present time. First there is the constant tendency to broaden any one territory, which at once leads over into the next factor. This is the growing unity which thus manifests itself between the various fields of interest and research and which maintains itself even in the intensifying of such interest and research in any one field. This intensification is the third tendency, while underlying and infusing all is that of a dynamic principle at work which explains why science must follow any one of these three trends or all of them together. Something, it is recognized, is unfolding itself and expressing itself in all these directions and only by pursuing it in all these ways can it be discovered and brought under human control. If it is health and efficiency then humanity needs more of it, and a better grasp of it. If the matter for study is the development of a disease process, dynamism working in a wrong direction, none the less but more must such tendency be sought out and followed along these lines, according to these designated principles, in order to bring such back into the ways of health.

Just such a work is undertaken in the publication of this book before us. The authors realize that in the increasing extent of the field of syphilography which the various branches of medicine—and sociology too—are opening up, there is a growing need for more definite study upon the subject and practical application along special lines. And yet in so doing they have thoroughly utilized the principle of the dynamism of the disease force that finds for itself a multitude of forms of expression and a merging of one form into another. The problem of neurosyphilis becomes therefore no hard and fast set of diagnostic rules or therapeutic ones, but one of a wide variety of manifestations, varying widely in degree and kind through all the range of neurologic or psychiatric symptoms which neurosyphilis in its broadest conception can present. And the very practical survey which the cases are given here in this report of actual histories provides also a more varied and hopeful prognosis in the treatment of cases, even of general paresis, and particularly in the social service to be more extensively rendered in prophylactic and curative work.

The content of the book is in the main a report of case histories, 137 in number, most of which have come under the actual observation of the

authors. Some of these are from the psychopathic hospital, which forms the gathering place of a wide range of cases in variety and degree and therefore furnishes just the material that comes before the general practitioner, for whom primarily the book is written. Some patients are from private practice and there are also longer standing committed cases. Illustrations are also added from autopsied patients and a chapter has been inserted reporting the presence of neurosyphilis in war material.

The arrangement of the book is a valuable one and is especially adapted to practical reference and direct appraisal and application of its contents. Its matter is presented case by case with the discussion briefly appended to each case statement in the form often of pointed questions which demand consideration. Each case is moreover pithily summarized in striking form at the top of each initial page, with a key to these cases included in the summary. A series of charts interspersed through the book presents in very graphic form the leading facts in clinical pictures, forms of treatment, etc. There are copious illustrations, clinical and anatomical. The case histories are arranged in chapters which constitute in general in their grouping the chief trends which neurosyphilis follows, systems of diagnosis, puzzles and errors which appear and the question of treatment. Small space is given to the medico-legal aspect, as this is deemed worthy of separate treatment, and as has been said, attention is paid to neurosyphilis and the war.

The book is so eminently practical in all its details and at the same time gives such emphatic consideration to the broader, more comprehensive aspects of the subject of neurosyphilis and its practical issues, that it can be recommended as worthy of individual study and of practical application by each physician who must meet these problems. It also should, as its authors desire and hope, urge forward the interest in neurosyphilis and help in the advance of psychiatry into general practice. They also urge the intensive attitude toward treatment, remembering that the treatment for neurosyphilis is the same as that for syphilis, but that it must be pushed harder. They also insist upon routine application of syphilis tests to every case of neurosis or psychosis.

JELLIFFE.

**Loeb, Jacques.** FORCED MOVEMENTS, TROPISMS, AND ANIMAL CONDUCT. Monographs on Experimental Biology. J. B. Lippincott Company, Philadelphia and London.

One of the most promising signs of the times in the scientific world is the growing unity between psychology and the physical sciences. Such a unity would have been claimed perhaps at all times, but it was not assured practically nor was it well maintained so long as the purposes of these branches of scientific investigation seemed to cross and contradict each other. Now as investigation and experiment become more and more exact they beget a greater accuracy and definiteness also in hy-

pothesis and conclusion. Quantitative measurements are taken for the establishment of biological facts, physico-chemical facts, or any others which have their place in the evolution and the conduct of life and thus these serve as a more exact and definable basis than heretofore has been known for the facts of human conduct. For these must always remain to man his chief interest, and for the sake of human health and progress his most practical concern.

In fact this paramount interest has necessarily blinded him to the exactness of facts which underlie it. But such studies as this one at hand bring the student back to such a substantial basis. All the motor activities which go to make up the conduct of life, the author assumes at the outset, are determined by internal or external forces. The establishment of his thesis proceeds first from the symmetry and polarity present in both animal and plant forms, which constitute a dynamic direction of motion, and interference with which by any alteration in stimulus causes forced deviation from the original direction of motion.

This may be accomplished by removal or injury, as of part of the brain, but the forced movements are also constantly due to the innumerable and widely variable factors which make up the conditions of environment and of the organism itself. In fact the forced movements artificially produced, and which may become conspicuous by their asymmetry, are important as an explanation and illustration of the fact that the normal conduct of any animal is always the result of a series of forced movements. The author uses certain experiments with galvanotropism and heliotropism to show that these phenomena, which have been variously explained teleologically or otherwise more or less fancifully, are nothing more nor less than forms of forced movements produced by the galvanic current or by the action of light. The latter phenomena are tested in a variety of ways, with regard to the source of light falling on the animal, or to the changes in the intensity of light and in the wave-length. Negative heliotropism serves equally well to establish the theory of forced movements.

The principle remains the same for the other forms of tropisms which the writer discusses. Among these are geotropism, rheotropism, stereotropism and chemotropism. The two latter especially he shows to have a marked bearing upon those forms or divisions of behavior which have been left unsatisfactorily defined and explained as instinctive or even as consciously willed. Among these are the activities grouped under sex behavior. A number of experiments with worms, fishes, insects, and even one observed case of a pigeon show how important is the tactile influence upon the orientation of animals, which makes for the stereotropism which they exhibit and which has a large share in such behavior as the sexual. Heliotropism also plays its share here, with ants and other insects at least, and the influence of chemotropism through the hormones occupies a large place. He adds to these tropisms those of

memory images, which work probably by as definite and rigid a law in their effect upon behavior. Their extent in variety and number far beyond our ability to know and account for them has led to the doctrine of free-will and our various phantastic psychological conceptions. The effect of mental imagery must, however, also be reduced in the final explanation to a tropistic definition.

The bearing of all this upon psychology or the understanding of human behavior is important in clearing the ground of vague and cluttering conceptions for a more accurate interpretation, where exact science shall also more surely become the method of the most important of all sciences, that of psychology. The further importance it has for the discovery of the tropisms at work in any given case and the alteration of behavior through discovery and control of these tropisms, be they physico-chemical, or psychic, that is in the field of memory images, is of utmost importance to the psychiatrist. At this the author more than hints as he presents this valuable contribution to the better establishment of psychological theory and practice.

JELLIFFE.

**MacCurdy, John T.** WAR NEUROSES. The University Press, Cambridge, 1918.

The edition in which MacCurdy's studies of war neuroses are permanently set forth is of a double interest. Not only does it bring more conveniently and more forcefully to the public, both medical and lay readers, these excellent though brief reports from his practical experience with British soldiers, which have already been brought to attention in American periodicals, but it also presents in the preface, written by Dr. Rivers, of London, an appreciation of Dr. MacCurdy's testimony to the nature and the treatment of the war neuroses and his emphasis in both of the psychological side. It is especially gratifying as another testimony to the fact that the experiences with neurotic difficulties in the war have made the English medical profession more familiar with the psychological approach, particularly as it is based upon a psychology of the unconscious. It therefore marks great advance through them in the general acceptance of a more truly effective psychotherapy in place of outworn physical methods of treatment, which, as Dr. Rivers states, were too much emphasized at the beginning of the war.

MacCurdy has briefly reported a number of cases which he has examined and has made a careful distinction between those which are actually of organic origin though neurotic in their manifestations, as in certain cases of so-called "soldier's heart" or in actual physical disturbance from concussion, and those which are purely psychic in origin and determination of their symptoms. Many of these were cases which had long resisted physical means of treatment, prolonged rest and every other external treatment. The author found that the troubles here were



due to hidden mechanisms of psychic conflict as in civil psychoneuroses, but that they were less deeply involved and therefore more quickly amenable to only a superficial analysis. They tended to develop most frequently where there was a somewhat unstable psychic basis, though often one that did not unfit the soldier for army life except under prolonged or excessive strain. Other cases of more serious lifelong neurotic constitution he considers among those who should have been weeded out of the service and in these conditions tended to be more serious. Slight neurotic conditions had been sometimes greatly improved by training.

He divides these war neuroses generally into two groups. The first is the hysterical conversion group, which is usually manifest among privates. In this he finds an unconscious choice of various conversion symptoms to carry out the more or less unconscious wish, in conflict with conscious ideas of duty, for disabling physical conditions which will unfit the patient for further service. The other group is that of anxiety neurosis, in which the conflict solves itself in this form owing to a different standard and different requirement in the case of the officer. Here the development of the symptoms is more complicated, fundamentally expressing a wish for death as a means of removal more in accord with the officer's standard, and then complicated by a secondary mechanism which conceals the direct wish and turns it into anxiety.

These simple studies throw much light upon the war neuroses themselves and should also tend to create greater interest in the psychological explanation of the neuroses, both those of war and the more complex ones of civil life. They should also throw light upon the psychotherapeutic approach to both of these classes of neuroses.

JELLIFFE.

## Obituaries

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### E. RÉGIS

In July of last year France lost one who had rendered high service to medical science in his own country and had done much to sustain that country's name in the neurological and psychiatric world abroad. Professor E. Régis, who was born in 1855, ended a life of great activity which had been especially devoted to the needs of his native land in his particular field during the last four years of his life. When the war came he left his ordinary clinical and professorial work and devoted himself in the military service to the psychopathological work in the army. It was to him that the psychiatric service of the XVIII region owed its origin and direction and he continued in his work with the army until forced by illness to leave it. Once in 1915 he had been interrupted by this cause but only for a period, when he again resumed service until his health would no longer permit. One son had lost his life in the air service and another was an officer of high rank in the army. Professor Régis' work with the army was not the first service of its kind he had rendered to France, for to him was largely due the development of military psychiatry in France and the organization and carrying out of her neuropsychiatric policy in the navy and the colonies.

As a teacher he was broad in his views, yet orderly and precise in his thoughts. The Bordeaux school of psychiatry stands as the representative of his qualities as teacher and thinker in the field of medicine which was his. He numbered among his grateful followers members of the legal profession to whom his elucidations of matters pertaining to legal psychiatry proved of marked value.

His medical publications are many in number and have made him well known in America no less than in other parts of the world. He has given special attention to the study of the toxic infections in relation to psychopathology, producing mental confusion and the toxic psychoses. This subject of mental confusion occupied him to a large degree. He recognized a constant element in the production of these states upon which was superimposed the element of delirium. He has done valuable original work upon the dream state of delirium and the manner in which it clears with the traces

it leaves behind it. He has also written upon the obsessions and impulsions, his book upon which has become a well-known authority. This has been followed recently with a study of the emotional nature and the remote causes of functional disturbances made in conjunction with his pupil Hesnard and soon to be published. With Hesnard he also contributed a monographic résumé of Freudian hypotheses of considerable value. He devoted much attention from



the first to the subject of general paresis and lent his weight to the establishment of its syphilitic etiology, when this was still much in dispute. He was particularly interested in the various manifestations which the paretic tendency may show and particularly its appearance in women and young people. Among his publications his "*Précis de Psychiatrie*," comprising his researches, has held a prominent place for thirty years as a clear and dynamic statement of the progress of neurology and psychiatry. In its second edition it was crowned by the Paris Academy of Medicine, and its earlier editions were well known to American psychiatrists through its translation by the Utica authorities.

His activities took him also into the field of medico-literary subjects. He published most interesting studies of celebrated regicides of ancient and modern times. His study of insanity in the drama led him to the recognition and investigation of certain universal deviate types and he also made a special study of J. J. Rousseau.

He held various positions of honor and trust. His position at Bordeaux was that of adjunct professor of the Faculty of Medicine in charge of the instruction in mental diseases. He was also president of the society of medicine and surgery at Bordeaux, had been president of the twelfth congress of alienists and neurologists of France and French-speaking countries and was a member likewise of many societies, among which were those of neurology and psychiatry in Great Britain, Moscow and America. For the past eight years he was a corresponding member of the Paris Academy of Medicine.

His personal attributes endeared him to those who knew him. Of short, stocky stature, he was quick in action and reaction, sympathetic to new ideas, yet firm in his own convictions and in private discussion as well as public debate straightforward, somewhat didactic but far from personal aggressiveness.

SMITH ELY JELLIFFE.

# The Journal OF Nervous and Mental Disease

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## Original Articles

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### A PATHOLOGIC REFLEX OF THE GREAT TOE: THE REFLEX OF THE SECOND PHALANX

By PIERO BOVERI, M.D.

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The point to which I desire to attract the attention<sup>1</sup> of colleagues is the following. Place a healthy person in bed, in a prone position, legs bent back, to a right angle on the thighs, in such a manner to allow the lower limb by means of the angle of the feet and legs to take the position of "Z." Then, striking the Achilles tendon with a reflex-hammer, generally a movement of the flexions of the feet is seen, in other words one observes the *Achilles reflex normal*.

Very often, in some sick or wounded persons, we have observed instead, in absence of the Achilles reflex, the percussion of the Achilles tendon provokes a flexion of the second phalanx of the toe.

As a result of this we have tested under what conditions this reflex was present, and having at our disposition the various materials of our neuropathological section, we have arrived at some interesting result.

The flexion of the second phalanx of the toe, is not seen in healthy persons, or ever not even when the reflex of the Achilles tendon is present. The persons who presented this reflex were

<sup>1</sup> See P. Boveri, *Riforma Medica*, n. 25, 1916, and *Rivista di Patol. e nervosa ment.*, fascie 10, 1916, and *Soc. de neurologie de Paris-Séance du Mai*, 1916.

afflicted by diverse diseases—lesions of the spinal cord, lesions of the spinal roots, lesions of the sciatic nerve.

The most part of these cases were wounds of war, and particularly soldiers who suffered from lesions of the sciatic nerve.

The best position for the observation of the reflex of the second phalanx of the toe is that which I have described before and which may be called *position "Z."*

This particular method of examination is not yet in use in the neurological practice. It is very simple and I think very important for the examination of the reflexes of the lower limbs, especially of the feet and small reflexes of the toes. The reflexion of the second phalanx of the toe is not noted in every instance that the Achilles tendon is absent, however in injuries of the nerves it is more frequent than one would think.

I state here briefly the cases most noted.

CASE I. Mil., E. Captain of the — Infantry Reg. 27 years. Wounded October, 1915, by a rifle bullet. Entrance right posterior of shoulder on a level with the seventh intercostal space. The exit under the right iliac crest. There was displacement of the vertebral column on a level with the last dorsal and first lumbar.

Here it is opportune to draw the attention of colleagues, especially surgeons, to a fact that is often observed in similar cases viz.: In rifle wounds in the vertebral column region, there is usually a *displacement "in toto"* more or less evident in the neighborhood of the column to the affected part. This fact is important as it aggravates the situation and suggests a symptomatology of spinal compression, which could not be interpreted several times, owing to the particular character of the wound.

When the captain entered in the hospital (February, 1916) he presented the clinical symptoms of a paraplegia of compression of the spinal cord. Movement was scarcely perceptible in the lower limbs especially to the left. The palpation of the nerve trunks very painful, there was slight atrophy of the muscles of the calf and thigh. The passive movements, the limbs and segments were painful.

The knee-reflex marked on the left. Absent also on the left the Achilles reflex. Very notable diffusion of sensory disturbance of both limbs, especially of the left. Osseous sensibility nearly abolished in the left limb.

Under slow and precise treatment the affected symptoms began to modify. The atrophy of the left calf muscles is diminishing, the sensations are limited to the left limb and very much less intensive and extensive; the motor power in great progress. The knee-reflexes are marked. The Achilles reflex on the right is normal.



Absent on the left. The percussion of the Achilles tendon provokes on this side the flexion of the second phalanx of the great toe.

CASE 2. V. P. Soldier of the — Infantry Reg. 35 years. Suffered from abdominal typhoid two years ago. At that time commenced symptoms of sciatica of the right side, probably in relation with the typhoid fever.

There exists slight atrophy. The palpation is not painful in any part, and there is loss of sensation.

Only rarely, and slow is the knee-reflex on both sides. The movements are all normal. The gait is different from that of the sciatic subjects: the patient walks with the leg extended and without touching the heel on the ground, and taking great care not to arouse the pain in the lumbar region. The reflex of the Achilles tendon on the left. Absent on the right. On this side the percussion of the Achilles tendon provokes the flexion of the second phalanx of the great toe.

CASE 3. "Z. L." Soldier of the Bersaglieri. 27 years. October, 1915, gunshot wound. The bullet entered the external region of the right thigh, on a level with the great trochanter. The exit posterior to the gluteal fold near to the mid line. There is noted a marked atrophy of the muscle of all the limb, especially of the calf. There is a state of foot-drop, with some feeble movements of adduction. Here is sensory feelings, localized in the front external lateral of the thigh; leg and foot. Osseous troubles of sensibility localized in the peronei and the toes.

*Diagnosis.*—Lesion of the right great sciatic nerve. The knee and Achilles reflexes are abolished to the right. The percussion of the Achilles tendon results in flexion of the second phalanx of the great toe.

CASE 4. N. L. Soldier of the — Infantry Reg. 24 years. Never wounded. He had syphilis four years ago. Made use of injections of sublimate for one year.

This case presents a notable hypertonicity of the muscles of the right thigh; more marked in the quadriceps. Here is observed, in addition, fibrillary contractions of the muscle. No existence of cutaneous trophic troubles. The knee-reflex is increased on the right; the left normal. Very rarely the plantar reflex is found on the right, which shows however a tendency to the flexion. The percussion of the vertebral apophysis provokes a strong pain, corresponding to the third and fourth lumbar vertebrae. Troubles of sensibility in all the right lower limb, more evident in the thigh and gradually diminishing towards the foot. The voluntary movements of the lower right limb, slow and reduced in relation to the nearly constant spasm of all the muscles. The gait is spastic in the

right leg, and the patient feels great pain in the thigh and the lumbar region in walking. Radiogram negative, Wassermann's serum diagnosis positive. On the right Achilles reflex absent. The percussion of the Achilles tendon provokes the flexion of the second phalanx of the great toe.

*Diagnosis.*—Slight compression, with meningeal phenomena of irritation, corresponding from the third and fourth vertebra lumbar. (Exostosis syphilitica?)

CASE 5. Soldier of the — Infantry Reg. 24 years. November, 1915, rifle bullet wound. Entrance interiorly on a level with the right iliac crest, anterior spine; the exit in the posterior of the gluteal fold corresponding with the buttock crease. Atrophy is present in all the right lower limb, and specially of the calf. Complete drop foot; slow edema of the tissues in all the foot. The patient accomplishes feeble movements of adduction of the foot; the toes, constantly flexed, with total inability of any movements of extension. There is anesthesia on the front dorsum of the foot and first three toes, which diminishes, then winds upwards in streaks, to the external front lateral of the leg. The knee reflex exists on the right. The Achilles reflex absent. The percussion of the Achilles tendon provokes the flexion of the second phalanx of the great toe.

*Diagnosis.*—Lesion of the right great sciatic, predominating in the fibers of the sciatic external popliteal.

CASE 6. Soldier of the Alpini. 32 years. Wounded August, 1915, by a gun shot which traversed the right buttock some inches deep.

The nature of the wound being rather superficial led one to think on first impression that, in this case, there was no direct lesion of the important nerve trunks. Mild atrophy present and hypotony of the muscles of the thigh and right leg. Troubles of partial sensibility of the right lower limb. Voluntary movements are all complete but executed with very little strength. The walk is slightly clumsy; the leg turned out. The phenomena of "*parcisis reflexa*" to which we have already called attention are here present.<sup>2</sup>

The knee-reflex on both sides. The Achilles reflex present on the left. On the right absent. The percussion of the Achilles tendon of this side provokes the flexion of the second phalanx of the great toe.

CASE 7. Corporal of the — Artillery. 33 years. Has never been wounded. November, 1915, was attacked by characteristic sciatica in the left lower limb. There is present slight hypertrophy of the muscles of the thigh and calf. The leg is held semiflexed on the thigh. The Lasègue symptom is very evident. On pressure of the nerve trunks,

<sup>2</sup> P. Boveri, On traumatic paralysis of reflex origin. *Riforma medica*, n. 16, 1916.

very strong pain. The knee-reflex active on the left. The cremaster reflex aroused with the pression of the adductors, is more active on the diseased side. There is hypoaesthesia and hypoaesthesia in all the left lower limb. Osseous troubles of sensibility in the leg and foot. The reflex of the Achilles tendon absent on the left. Here the percussion of the tendon arouses the flexion of the second phalanx of the great toe.

*Diagnosis.*—Sciatica.

CASE 8. C. P. Soldier of the — Infantry Reg. 36 years. Never been wounded. Carriage accident at 23 years suffered fracture of the right tibia. Addicted to much use of wine and liquors. For a year complains of pain and heavy weight of the lower limbs, the right particularly. Muscular hypertrophy and hypotonia present on the right. Difficulty in walking, drags the right lower limb slightly. There is hypersensibility and very active reaction of defense. Knee-reflexes are marked on both sides. The Achilles reflex is present on the right. The percussion of the Achilles tendon provokes a flexion of the second phalanx of the great toe.

*Diagnosis.*—Alcoholic neuritis.

CASE 9. Soldier of the — Infantry Reg. 21 years. June, 1915, rifle bullet wound. A little more than an inch above the region of the front internal knee joint. Exit from external of the popliteal area. Atrophy of the thigh muscles more conspicuous than appears in the leg. There is drop foot. Only slight movements of adduction observable. The toes capable of very little movements. There are troubles of sensibility in the external region of the leg, and dorsal side and external of the foot. The knee reflexes equal on both sides. The reflex of the Achilles tendon absent on the left. The percussion of the Achilles tendon provokes the flexion of the second phalanx of the toe.

*Diagnosis.*—Lesion of the left sciatic external popliteal nerve.

CASE 10. Soldier of the — Artillery. 34 years. Typhoid fever at 9 years; malaria at 15; joint rheumatism at 18 years. From July, 1915, suffers from pains in the left lower limb, which were diagnosed as sciatica. There is light atrophy and hypotonia of the muscles of the limb. Here pressure on the nerve trunks is very painful. Symptoms of Lasègue is slightly present. Very little troubles of sensibility. The knee reflexes are difficult to discover Achilles reflexes and median plantar reflexes are absent on both sides. The plantar reflex on the right is normal. The left scarcely present. The percussion of the Achilles tendon on the left provokes the flexion of the second phalanx of the toe.

*Diagnosis.*—Radiculitis, predominating on the left side.

The reflex which we have described has a certain importance because it can enlighten us on the state of the nerve's condition and

deep reflectivity. In fact, when the lesion of the great sciatic or of the sciatic internal popliteal nerve exists, neither the Achilles reflex nor the reflex of the second phalanx of the toe is observable. On the contrary, the presence of the reflex of the second phalanx is diagnostic of a *partial lesion* of the great sciatic nerve or of the sciatic external popliteal. It seems useless to add that in the search of the reflex of the toe, to avoid mistakes it is necessary that the percussion be done exactly on the Achilles tendon. A percussion, a little higher, or on either side could deviate and render the result positive because a direct stimulus of the muscle can give a false reflex. So much for sciatic nerve lesions.

In cases of spinal lesions, the reflex is also important for the light it throws on the localization and extension of the spinal lesion. Also it enlightens the evolution of the disease. The reflex appearing in persons who did not at first present it, is a symptom of improvement.

What is the real signification of this reflex? Is it the result of a reflection? Is it a propagation of a stimulus which not normally developing for the interruption of the superficial muscles of the calf, runs more deeply, in the big toe?

It is probable but we cannot be certain. In any case whatever may be the genesis of the reflex, we expect from more complete researches the explanation of this interesting fact.

## THE DISPENSARY AND PSYCHIATRY. AN ANALYSIS OF CASES.

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This paper is an outgrowth of an analysis of some 140 or more patients suffering from psychoses who have applied at the Vanderbilt Clinic for treatment in the past two years. Regarding the quality of the material worked with, the histories taken in the great majority of cases have been carefully and intelligently prepared, although a number, none of which are used in this analysis, had to be thrown out because of the poor anamnesis and poor history taken. In order to help to bring out of the extremely unsettled science known as psychiatry a definite series of entities, certain clear conceptions of the psychoses must be arrived at. This cannot be done without fundamental and careful work along the lines of investigation into the life histories of the patients suffering from mental disease. And it seems to me that it is just in a clinic such as ours, which receives the mental cases in their earliest stages, that careful work along these lines is indicated.

**Psychasthenia.**—Twenty-six histories out of a great number, many of which were not complete, were selected because they seemed to give definite information and were worthy of use in attempting to arrive at an understanding of what is meant by this term. It did not seem profitable to make a statistical study of these cases, but rather to attempt to arrive at a definite symptom complex which would enable us to obtain a clear conception of the make-up of these individuals.

The patients seem to be of the class to which the indefinite terms neuropaths, psychopaths, etc., are applied. They are, as a rule, positive, self-willed, selfish, inefficient, very restless under discipline or even mild stress, undependable, liars, and become furious with those who make any attempt to control them or their actions. The women cannot bear housework, their children irritate them and annoy them, they become easily fatigued, their interests are many, but not sustained. They do not sleep well. They are usually introspective, this giving rise to many somatic complaints. A great many were said to have been nervous and delicate as children and as a

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result were pampered and coddled by their parents, growing up undisciplined, selfish and untractable. Of these twenty-eight cases the ages range from 12 to 32, the average being about 21 years. Eighteen were women, eight were men. A great many of them had sexual conflicts of various kinds. A close scrutiny of these twenty-six histories failed to show that there were any hereditary stigmata in the history. The things inquired after particularly were alcoholism, insanity and epilepsy.

It is realized by the author that the above composite picture of these 26 cases in which the diagnosis of psychasthenia was made does not tally with the classifications generally accepted. Many of these cases showing irritability, various pains and hyperesthesia and mental and motor fatigability should really have been diagnosed neurasthenia. Others with abnormalities of personality characterized by disorders in the emotional, and volitional spheres are really cases of constitutional inferiority. However, the diagnosis of psychasthenia was made in each case and therefore they were analyzed as such. Possibly some of them might properly have been labelled hysteria, but evidently the conception of the various men making the diagnosis which was officially given of these cases was not common to all the individual examiners. This is perhaps a reflection of the great amount of confusion regarding the general conception of what is meant by the terms psychasthenia, hysteria, neurasthenia and constitutional inferiority. The author must confess that on this account not as much work was done on the cases coming under this grouping as was performed in some of the other groups which follow.

**Late Paranoid Conditions.**—This is a report of five cases in which dementia-precox-like or paranoid reactions occurred in individuals, all of whom were over 45 years of age.

The first case is that of a woman, R. B., 50 years of age, married, who soon after her menopause six years ago began to hear the voices of men who made slurring remarks about her character, accusing her of immorality. She saw these men climb up the fire escape to the roof and then heard them making noises and speaking in the apartment adjoining hers. They spoke through the walls to her and blew their breaths in to her rooms. The odors which they blew into the room were offensive and were meant to overpower her. There were four of these men, and they also talked a great deal about her husband. This individual, it seems, had always had difficulty during her married life. She was 34 years of age before she married and her married life was not very happy because



of constant quarrels with her husband. The patient was also impressed with what was probably a delusion, that she had aborted when she was 16 years of age. She has never been pregnant since marriage. This seems to be undoubtedly a case of late dementia precox, firstly, because of hallucinations of vision and sight, because of the diffuse character of the ideas of reference and the non-systematization of the delusions, and secondly, because of evidence of deterioration. There are none of the ideas of grandeur, none of the definite ideas of reference and persecution, plausibly elaborated, which occur in true paranoia.

The second case is L. D. W., 69 years of age, a civil engineer, who began when he was 60 years of age after a long, fairly moderate alcoholic life, to tremble as if in a continual chill. He could not sleep well and jumped in his sleep as if he was being tortured. The patient is extremely conceited and has ideas of grandeur concerning his ability as a medical investigator and also boasts considerably concerning his tremendous erudition in all fields of investigation. He brought to the clinic a treatise in which he shows that he feels that the medical fraternity has been culpable in a great many ways. A very good idea of this man's psychosis can be discovered from the letter which is part of his record. This case appears to be more nearly a true paranoia than any of the five here presented. We have here a suspicion which is fixed in the patient's mind, plausibly elaborated, and built around it ideas of grandeur concerning his ability.

#### THE CAUSE OF ZYMOTIC DISEASES

It appears to me from a layman's viewpoint that the medical faculty has oftentimes been on the verge of discovering the cause of what years ago was called Zymotic diseases and suddenly have been side tracked or jumped the track and arriving at a false conclusion.

Take for instance what in the principality of Wales was known as consumption or a decay (*Phthisis*) after a series of serious cases were benefited by a sojourn to Tooquay in Devonshire which is well sheltered from the winds of winter and especially the east wind blowing through a pine wood other places of a similar temperature were recommended and Egypt especially so, where disastrous results followed and it did not dawn upon them for many a long year that it was the wind blowing through the pine trees was the healer, or take the experiment made on a huge Newfoundland dog with nicotine which killed him they jumped to the conclusion that it was a most deadly poison never for a moment enquiring whether the dog's heart was normal or when he was last fed.

In tuberculosis a system of pampering, coddling and cuddling was

adopted and indulged in, the worst of all methods. The musquito and fly have been denounced as disease carriers whilst Pediculos and his parasite a tiny red insect with a black spot on his back scarcely visible to the naked eye which I have called for want of a better name "Pedix" have been passed unobserved perhaps the filthy nature of this pest has been the cause that no investigation was made, I was led by a strange fatuity to do and I recalled to mind incidents long forgotten.

A. In the year 1862 Hugh Rees was appointed surgeon to the Dinorwicquarries where 2,500 men and boys were employed and taking 5 to a family and 2,000 of them married would mean a population 12,500. His attention was drawn to the high mortality among the young of both sexes when nearing the age of puberty and he selected 3 cottages where the highest rate of mortality occurred.

Site No. 1—Shaded by trees where the sun's rays feebly penetrated, damp walls.

Site No. 2—In a shady nook, sunshine after midday only.

Site No. 3—Only after noon.

The floors of all were laid with slate blocks—small windows seldom opened, filthy floors dry swept. He observed that lice were prevalent. He ordered all windows in the neighborhood thrown open daily and all bedding be carried out to the sunshine and a layer of wet tea leaves or wet saw dust spread over all floors before sweeping. The results were marvellous, in less than 5 years the deaths from tuberculosis had diminished 50 per cent.

B. In 1894 I became tenant of Tygwyn farm, there was a shippon with stalls for six milch cows, the only light and ventilation was by means of a door 6' & 4' in the middle of the building I observed that the cows farthest from the doorway invariably when let out in winter for watering took a much longer time to cleanse themselves than those close to the door licking their udders or rather between the udder and thighs. I changed them about that caused the previous ones who took a long time to clean themselves in a shorter time whilst those who before were able to do in a short time now required a longer time, I then investigate further and found those in the dark three times more heavily infected with lice which being licked by the cows or dropped into the milk-can in process of milking caused germs of tuberculosis in the milk.

C. I have suffered from Influenza four times with relapse twice. The 1st and 2nd cases under Doctor's treatment ordered to bed and the room heated to about 65° with a diet of warm soups warm milk and scotch whiskey. Indoors 3 weeks with relapses.

3. Doctor advised me to go on a spree not a drunken one but a jolly one among lively friends. I recovered in a fortnight's time.

4. Refused to go to hospital nor to bed but boldly camped out under canvass using naught but cold water and cold foods bathing morn and eve head throat and chest with cold water and recovered in a week. It was the pampering and cuddling in the first cases which retarded recovery.

It is said that the late Cardinal Vaughan Archbishop of Westminster gloried in the fact that he was lousy denoting poverty and health, he certainly was a robust man with a rosy face but he was a great sufferer from Asthma and bronchial troubles and remained in doors in winter in a room of high temperature he died a comparatively young man and I maintain he shut himself in with his enemies who soon had the mastery over him.

It will be observed that in the fore-going light and darkness, heat and cold play a prominent part.

The louse and its parasite revel in darkness and heat whilst they avoid light and cold. As a matter of fact the louse and his parasite are responsible for pretty near all Zymotic diseases what is the itching in the rectum after sitting on a coal seat but the louse who seeking a warm place to a congenial spot where his prolific family shew in a few days what he is doing by causing bleeding piles.

Then when this pest is so much in evidence in New York where ventilation is bad, heated rooms, causing a vitiated atmosphere, all dry sweeping, the sun's beneficent rays shut out by high buildings, bread kneaded in filthy and lousy cellars that they do not find their way especially on a dry day with a westerly wind into mouth and nostril causing catarrh, athsma, and bronchial troubles, added to the foregoing where so little salt and acids are used which he flees from and so much candy and syrups are consumed, which he revels in it is little wonder that tuberculosis is so prevalent.

### *Experiments*

Place a louse on a cold steel plate he becomes paralyzed and firmly adheres to place his parasite which I call "pedlic" for want of a better word he will stuff under him for warmth, heat the plate and both become lively but the pedlic particularly so rivalling any squirrel in activity and both run away from light and creep to the snuggest crevice where there is warmth then again you may pour boiling water and they lose none of their activity when dry.

"ITHEL"

Mystic Name.

The third case is A. S., age 45, a widow, who began two years ago with ideas of influence, that she was being worked upon by electricity, or that men were trying to draw electricity out of her body. These men were business men in the vicinity interested in her being forced out of the neighborhood. She saw these men talking in groups and betting gleefully on how soon they could make her move. In reaction to this delusion, the patient moved numerous times, and she would not sleep on a bed because the electricity in the springs made her feel miserable and kept her awake. This patient had

apparently been perfectly well before her trouble, and the onset of the illness dates from a period of depression several months after the death of her husband. This seems to be a true dementia præcox reaction, characterized by weakness in the power of adaptability, abnormal suggestibility and ideas of influence, and a diffuse paranoid trend.

The next woman is N. H., age 45, married. She was tortured by horrible thoughts, especially at night, both in a waking state and in dreams. She constantly had visions of the death of members of her family, particularly her husband and near relatives. In her day dreams she saw her dear ones the victims of horrible accidents. She hears the voices of people whispering to her about the death of these relatives. This patient had an almost exactly similar attack about two years ago and got well in three or four months. The onset of this first attack was sudden and followed three induced abortions which she had in a few years. For several weeks just before coming to the clinic she was visited by a friend. When the friend left the house she accused her of drawing blood by means of a leach which the patient's friend had placed under her heart. Not only had this woman done this, but she had forced the patient to carry an egg under her arm, and by means of a magnet had drawn her vital fluid from her through a hole which this woman had made in the patient's side. She hears this woman's voice talking numerous stories into her head about her infidelity to her husband. In reaction to this delusion, the patient presented herself at the house of her torturer and created a scene and had to be forcibly removed.

This case seems to be also a dementia præcox type of reaction despite the fact that there are two distinct attacks of mental trouble within two years. The ideas of influence, the diffuse paranoid trend of the delusions, the somatic, visual and auditory hallucinations, all point to dementia præcox.

The fifth and last case is E. D., age 71 a houseworker by occupation, and widow. The patient began about nine weeks ago following an attack of grippe with an agitated episode during which she walked the floors at night and heard the voices of the people who lived below her. These people would talk about her and wanted to kill her. They were connected with the "movies" and wanted to work on her with electricity. They control her and know her thoughts and are driving her insane. They have cut her heart in three pieces. They are jealous of her. She hears people say that they never saw a woman like her for ability and attractiveness. She

hears men offer thousands of dollars for her. For three days before presenting herself at the clinic, the patient refused to eat. Her daughter said that she kept a lot of junk, such as knives, scissors, papers, etc., in her clothing, saying that these would prevent the people down stairs from working the electricity on her. The patient also has impulsive ideas and has threatened numerous times to jump out of a window. Memory is good for both recent and remote past and for dates, and from the daughter it was later ascertained that for six months before the supposed attack of gripe, the patient had complained of hearing voices, particularly from the people who lived below her. The daughter says that as long as she could remember the mother was shy, retiring, obstinate, sensitive and headstrong. She was always considered peculiar. Blood pressure in this case was only 150 and physically the patient was well. This also appears to be undoubtedly a dementia præcox reaction.

These five cases are presented in a group separated from the actual dementia præcox group because of the fact that they have all occurred in persons far beyond the average age for the development of dementia præcox.

I have searched the literature very carefully and have not been able to find any reported case wherein the dementia præcox reaction has occurred so late as it seems to have done in the patient E. D., whose symptoms began when she was approximately 70 years of age. The only frankly negativistic symptom in any of these cases occurred in this last mentioned one, who had refused to eat for three days before coming to the clinic. The patient was not otherwise negativistic, and all five cases are probably undoubted examples of paranoid states according to the definition of Kraepelin.

These are not apparently cases of late katatonia of which quite a number have been reported recently. It seems impossible to continue to adhere to the conception that the dementia præcox reaction, therefore, occurs almost exclusively during the adolescent period.

**Alcoholism.**—This is a consideration of 23 cases of mental disease in which alcohol is one of the essential causes of the mental disturbance. A table follows which gives a brief statistical study of the analyses made in these cases; the points considered in the table being the apparent essentials.

*Age.*—The average age of the cases for this study was 42.7 years. There were at least fifteen or sixteen other cases which had been diagnosed as alcoholism but were not used because of incomplete records. The average age, if these cases had been added

for this purpose only, would not have been changed materially. It is rather interesting to know, therefore, that in our cases the onset of the trouble occurred during a period of life when mental troubles of all kinds are most common. Most of the statistics on this subject show that the age of 40 is the average one in which the onset of various psychoses occurs most frequently. Quoting from the statistics of the State Board of Insanity of Massachusetts for 1915, we find that the average age at which patients have their first admission to institutions for the insane in that state is about 43 years. There are six females and seventeen males in this group.

*Other Drugs.*—There is a definite history of marked abuse of tobacco in six cases and in these particular cases it may be possible that one should consider not only the influence of alcohol on the production of the symptoms, but also the possibility of the added intoxication due to tobacco poisoning.

*Assigned Cause.*—An assigned cause by the patient for the abuse of alcohol was frequently denied as existing within the knowledge of the individual in thirteen cases. In the other ten cases various causes were assigned for the alcoholism. It is interesting to note the great variety of causes which these individuals give as explanation for their over-indulgence in alcohol. Of the ten giving explanations none were alike excepting two who gave as the cause the death of near relatives.

*Insomnia.*—This is a very common symptom and occurred in a more or less marked degree in every case except three. It usually was an early and persistently prominent symptom.

*Hallucinations.*—Eleven patients suffered from hallucinations. Of these eleven, two had purely visual hallucinations, three had pure somatic, two purely auditory and four both auditory and visual. There was one case which suffered from *muscæ volitantes*.

*Physical Signs.*—Tremor was almost as constant a symptom as insomnia. This symptom was not indicated in the table unless the tremor was very marked and unless it attacked not only the hands, but also the face, lips and tongue. The tremor is coarse, irregular and occurs both during rest and motion of the parts affected, and cannot be controlled by effort. In the cases without neuritis it was usual to find active tendon reflexes. It is interesting to know that of these twenty-three frankly alcoholic cases, only three showed any unsteadiness of gait sufficiently marked on examination to make it worthy of note. In one case there was present an Argyll Robertson pupil in the absence of positive laboratory or clinical syphilis.

*General Hereditary Considerations.*—There were only two



patients in whom a distinct alcoholic heredity could be found in the ascendants. In one there was a history of tuberculosis in the family and in another, five children of the patient died in very early infancy. Certainly not very much can be found here to warrant a belief that in at least this group of cases hereditary considerations played an important part.

*Mental State.*—Fear, apprehension and depression were present more often as a group than any other set of symptoms. In analyzing the symptoms in these cases, we find that the most common are insomnia, tremor, exaggerated tendon reflexes and a mental state characterized by fear, apprehension and depression; this symptom complex occurring in persons who apparently are not hereditarily predisposed to mental disease. The question arises immediately whether the alcohol is the actual cause definitely of the trouble in these patients. A comparison between alcohol and its attendant manifestations and other conditions will, I think, immediately bring to mind the fact that the symptoms complained of as a group are not peculiar to alcoholism, but are very usually complained of in all the functional neuroses and so-called anxiety states. An analysis of the individual make-up of these cases tends to show that they are essentially neurotic; that they find great difficulty in adjusting themselves to circumstances which normal persons have to contend with daily without allowing themselves the luxury of taking a flight into an alcoholic neurosis in order to escape mental stress. It seems quite permissible to suspect that these patients are essentially neurotic first and alcoholic afterwards.

A number of cases analyzed seemed to show this, particularly the case of J. C., age 48, who began to drink immediately after the death of his wife four years before the onset of his trouble. Not only was this patient unable to adjust himself properly to his bereavement, but he found great difficulty in making a proper sexual adjustment, for he had no sexual experience of any kind since the death of his wife and was practically impotent.

The patient who drank because his wife was sexually anesthetic also shows this inability to adjust properly to the environment.

The patient, age 59, who got up his trouble after a scalp wound, shows along other lines a similar instability of the nervous system, which was not able to insure his recovery promptly without further trouble than would usually occur to the average healthy individual from an ordinary scalp wound. For the reason just discussed, the majority of these cases without actual hallucinations or indications of vascular changes have been called alcoholic neurosis.

*Diagnosis.*—Adopting our diagnosis, then, of alcoholic neurosis, there were twelve of these cases; two of them had accompanying neuritis, seven were cases of alcoholic hallucinosis and two were cases of peripheral neuritis. One of these cases had a distinct 7th nerve involvement on both sides, not only the motor but the sensory symptoms indicating a peripheral lesion of this nerve. One case is called alcoholic epilepsy. This patient never had convulsions before his attack, cleared up quickly after he was taken off alcohol and remained perfectly free from convulsions for a long time after the alcoholism was cured, and has not had any to date. It would appear, therefore, that we are justified in calling this case alcoholic epilepsy. The attacks in this individual were not accompanied by long periods of unconsciousness, but the actual spasm continued a long time after the consciousness was regained. There was no aura and no drowsiness after the attacks. The attacks were very frequent, as many as four or five in a day and stopped suddenly two days after the alcohol was withdrawn. The attack lasted one week.

There were two cases of arterio-sclerosis in which it would seem definitely possible to state that alcohol was a cause, and there was one case of Korsakoff's psychosis with very mild polyneuritic symptoms. There was one case of dementia which it was presumed was due to alcohol. In this connection, however, it would be well to clearly state that there was nothing in the character of the dementia which would lead one to suppose that it was different in any way from the terminal dementias of dementia præcox, and here another interesting situation arises, not only in this case but in the case of J. F., age 40, single, a policeman, who was a periodical drinker and whose attacks always began with a period of depression so profound as to be actually painful and which lasted for three or four days before the onset of the drinking bout.

Another case is that of the patient, R. S., age 38, with an alcoholic family history, who had a period of depression lasting six months before the onset of the alcoholic habits.

A still further illustration is T. O., age 41, who was depressed, as a result of family troubles which worried him, for a number of months before he began to drink heavily.

The question in these cases is, does the alcohol and the symptoms of its ingestion cover and cloud the development of an actual psychosis? On this point various authorities agree. Kirby, in the *Psychiatric Bulletin*, Vol. 10, No. 3, found that of 102 cases of alcoholism investigated by him, 15 per cent. are now in the hospital

## CASES OF ALCOHOLIC PSYCHOSES

Age	Sex	Other Drugs	Assigned Cause	Insomnia	Hallucinations	Physical Signs	General Hereditary Considerations	Menial State	Diagnosis
48	Male.	Tobacco 3 +	Death of wife.	First symptom, very marked.	None.	Reflexes left arm greater than right. Right arm absent. Right knee jerks active. Left minus. Tremor both hands. Twitching muscles both shoulders. Diminution pain and temperature in arm and both legs. Tenderness of nerve trunk. Blood pressure 160. None.	Five children died in infancy.	Fear, apprehension, sexual impotence since death of wife.	Alcoholic neurosis.
36	Male.	None.	None.	Preceded onset for many days. Very marked following an attack of Delirium tremens one year ago.	Visual.	None.	None.	Fearful, apprehensive; hallucinations of sight.	Alcoholic hallucinosis.
45	Male.	Tobacco 3 +	None.		Somatic, feeling that something is being bored into his head, also muscae-volantes.	Tremor. Sluggish plantar reflex. Loss of taste for salt and sweet, both sides of tongue, diminished taste for bitter and sour. Enlarged liver. Weakness both sides of face.	None.	Depressed, fearful, apprehensive, hallucinations.	Alcoholic hallucinosis, with neuritis (double) of the 7th nerve.
59	Male.	None.	Trauma of head.	None.	Auditory.	Patellars exaggerated 3 +. Convulsions, three or four a day. Diminished deep reflexes.	None.	Semi stupor, confusion, auditory hallucinations.	Alcoholic epilepsy.
48	Male.	None.	None.	None.	None.		None.	Confabulations, disorientation, confusion, euphoria.	Korsakoff's psychosis.

## ALCOHOLIC PSYCHOSES

Age	Sex	Other Drugs	Assigned Cause	Insomnia	Hallucinations	Physical Signs	General Hereditary Considerations	Mental State	Diagnosis
36	Female.	None.	Painful menstrual periods and death of husband.	Very marked.	None.	Tremor.	None.	Anxiety, restlessness and headaches.	Alcoholic neurosis.
48	Male.	None.	None.	Marked.	None.	Edema of eyelids. Unsteadiness in standing. Tremor. Pupils sluggish in reaction to light. Tremor. Blood pressure 180.	None.	Anxiety, irritability and restlessness.	Alcoholic neurosis.
55	Female.	None.	None.	Not very marked.	None.		None.	Fearful, apprehensive, irritable. Memory for recent past and dates very poor.	Alcoholic arterio-sclerosis.
35	Male.	Tobacco 3 +.	Fear of tuberculosis.	Marked.	Visual and auditory.	Tremor.	Father and brother died of tuberculosis. Father nervous and irritable.	Auditory and visual hallucinations. Fearful, apprehensive. Talks great deal. Sees things in threes or pairs.	Alcoholic hallucinosis.
50	Male.	None.	None.	Following attack of delirium tremens two years ago. Very marked.	None.	Unsteady gait. Right patellar greater than left. Both ankle jerks absent. Tremor. None.	None.	Fearful, apprehensive, restless, timid.	Alcoholic neurosis with neuritis.
41	Male.	Tobacco +.	None.		Visual.		None.	Hallucinations of sight. Fear. Apprehension.	Alcoholic hallucinosis.
49	Female.	None.	Asthma.	Very marked.	None.	Bronchitis.	None.	Fear. Apprehension. Anxiety. Restless. Anxious. Depressed.	Alcoholic neurosis.
48	Male.	Tobacco 2 +.	None.	Marked.	Somatic, feels a pounding sensation inside of chest like a hammer.	Tremor. Enlarged liver. Blood pressure 100.	None.		Alcoholic neurosis.

## ALCOHOLIC PSYCHOSES

Age	Sex	Other Drugs	Assigned Cause	Insomnia	Hallucinations	Physical Signs	General Hereditary Considerations	Mental State	Diagnosis
37	Male.	None.	Heridity.	Very marked.	None.	Patellars exaggerated.	Father and brother alcoholic.	Anxiety. Restlessness and irritability.	Alcoholic neurosis.
36	Male.	None.	Sexual anæsthesia of wife. Wife's infidelity (?). Lost month's rent.	Marked.	None.	None.	None.	Irritability. Fear. Suspicion. Anxiety.	Alcoholic neurosis.
26	Female.	None.		Marked.	None.	Both patellars diminished. Tremor. Unsteadiness in gait and posture.	None.	Anxiety. Depression. (It is hard to make out whether this patient is lying about loss of money, or whether she spent it in drink.) Patient becomes blue and depressed for three or four days before each attack of drinking.	Alcoholic neurosis.
40	Male.	Tobacco 3 +	None.	Very marked.	Only during certain attacks. (Patient is a periodical drinker.) Auditory and visual.	Tremor.	None.		Alcoholic neurosis.
43	Male.	None.	No assigned cause for alcoholism. Cause for attack cessation of use of alcohol two weeks ago. Induced miscarriages.	Marked.	None.	None.	None.	Patient becomes blue and depressed for three or four days before each attack of drinking.	Alcoholic neurosis.
38	Female.	None.		Marked.	None.	Tremor. Blood pressure 200, S 125 D.	Father and mother alcoholic. Brothers and sisters periodical alcoholics.	Depressed for six months. Self accusations because of induced miscarriages, ideas of retribution.	Alcoholic neurosis with alcoholic arteriosclerosis.

## ALCOHOLIC PSYCHOSES

Age	Sex	Other Drugs	Assigned Cause	Insomnia	Hallucinations	Physical Signs	General Hereditary Considerations	Mental State	Diagnosis
43	Female.	None.	None.	Very marked.	Visual and auditory.	None.	None.	Hallucinations, visual and auditory. Irritability. Depression. Fear. Apprehension. Suspicious, has ideas of persecution.	Alcoholic hallucinosis.
	Male.	Tobacco 3 +.	None.	Very marked.	Visual and auditory.	None.	None.	Hears people conspiring to kill him. Sees people in street gather in groups to talk about him.	Alcoholic hallucinosis.
51	Male.	None.	None.	None.	Somatic, thinks he has a number of things inside his head and in his genital organs. Auditory.	None.	None.	Agitated. Restless. Silly. Very much demented.	Alcoholic dementia.
46	Male.	None.	None.	Marked.		None.	None.	Auditory hallucinations. Fear and apprehension. Depression.	Alcoholic hallucinosis.



as cases of dementia præcox, and 7 per cent. remained as cases of manic-depressive insanity. He says that the combination of hallucinosis with manic-depressive insanity is frequently met with. Schneider, in the *Psychiatric Bulletin*, Vol. 9, No. 1, states as a conclusion after presenting some cases illustrative of this point that "the alcoholic hallucinosis are purely functional and are always allied to manic-depressive insanity, etc." It would seem to me justified, therefore, to call the cases of J. F. and R. S. episodes of manic-depressive insanity, and the case of D. W., age 51, a case of terminal dementia præcox.

**Manic-Depressive Insanity.**—This is a report on twenty-five cases of manic-depressive insanity, adopting the classification of Kraepelin. An analysis of these cases is undertaken with a view to finding out more particularly whether it would appear possible to interpret these cases either of depression or elation, as excessive reactions to unusual external or internal influences in individuals not necessarily constitutionally defective, or whether such a constitutional defect is essential to the development of depressions or excitements.

It will be recalled that Kraepelin and those of his school regard all depressions and excitements as one reaction and give the term manic-depressive insanity a widely inclusive meaning, and further than this, they regard the development of their conception, manic-depressive insanity, as impossible excepting in individuals who are constitutionally predisposed. Tanzi, and others of the English, French and more particularly of the Italian school of psychiatrists are inclined to break down this massive group of manic-depressive insanity into individual groups, and give the name mania or melancholia to the symptom complex, according as to whether either excitement or elation or, on the other hand, depression, is the predominating feature of the particular attack. Tanzi particularly would limit the term manic-depressive insanity to those cases of circular, or periodic insanity in which there are frequently recurring, not necessarily regularly alternating, attacks of mania or melancholia. The most important point in Tanzi's discussion of the depressions is that he considers it possible and even not uncommon to witness in individuals not at all predisposed by any constitutional defect or hereditary stigmata, an attack of depression occurring as a result of a sufficiently profound stimulus of an unpleasant nature. In these individuals he has considered the depression as not pathological even though such a patient might have more than one attack, providing, however, that each subsequent attack had an exciting

cause sufficiently important to the life and happiness of the individual.

In an analysis of a large series of cases Gucci found that a very large percentage of the cases admitted with the diagnosis of melancholia recovered from the single attack and never returned for the same condition. Gucci found that in examining the histories of all cases of mania or melancholia which occurred during a period of 55 years in a hospital for the insane in Florence, there were 2,419 cases of melancholia and mania which were admitted to the institution, recovered, and never had another attack. Some consideration must be given these figures, because the district which this hospital drained is not a changing one and Gucci was able to follow up his cases in order to determine whether these patients had subsequent attacks or not. Cases in which there are either recurring attacks of depression or excitement without sufficient exciting cause or in which the attacks occur more than once or twice at long intervals during the lifetime of the individual, Tanzi considers to have a constitutional basis. To these cases Tanzi has no objection to the term manic-depressive insanity.

An analysis of Tanzi's material causes him to make the statement that depressions are less likely to occur as an expression of a pathological mental constitution than are the manias. He found that mania developed more frequently in individuals who were constitutionally defective or predisposed. In nearly all of the cases of single attacks of melancholia or even in those cases where there occurred two attacks at long intervals, Tanzi was able to demonstrate what he considered a sufficiently profound exciting cause.

The conception of the *cenesthetic* sense of the German school has always been an attractive one. It seems very reasonable to suppose that there must be highly developed in the human the sensation which enables one to decide whether one is feeling well and happy, or whether, on the other hand, one is depressed in the absence of any particular illness. It seems possible that sensations are received by the cerebrum from all the various organs of the body which in the aggregate are summed up by the individual unconsciously, enabling him to determine whether he feels happy or unhappy in the absence of any particular reason existing in the environment for his being either one or the other. Expressed in another way, it would seem that dissociating one's self from any conscious outside influences it is still possible for any normal individual to feel fully at peace and thus happy, or the opposite, dissatisfied and depressed. This play between the extremes

of happiness and unhappiness is very wide within normal limits and is highly indefinite and difficult of determination accurately. Arbitrarily, it would seem wise to apply a standard of measurement to determine this point in the individual case, namely, the amount of loss of efficiency occurring in the individual by his unusually elated or depressed state. In other words, the depression is considered pathological when it is profound enough to disturb seriously one's relationships with the outside world, so that such an individual becomes noticeably out of touch with his fellows and his environment. Even this is a very poor criterion to apply properly in certain cases. The main difference between the individual whom we consider possessed of a normal affective development and one who is mentally unstable, is the power that the former possesses of recovering the normal balance between elation and depression, after apparent or real stimuli bringing forth either one or the other mood. A great many of us recover more quickly from bereavements and sorrows than others, and it is exactly so with joys and good fortune, but it is not possible to definitely place within the realms of pathological mentality those cases in whom the mental reaction of depression or elation either lasts too long or is too profound, providing, of course, that there is a sufficiently strong cause for either the elation or the depression. As has been said before, these considerations mainly have been kept in mind in attempting to analyze the following cases:

It seems clear from a reading of the accompanying charts that following the lead of Kraepelin, Tanzi and others, we have recognized constitutional, mental, and hereditary factors, in certain cases of depressions and elations, and have accordingly labeled them manic-depressive insanity. Of this type of cases in which abnormal fluctuations of elation and depression exist with finally an attack of psychosis which cannot be considered other than an expression of constitutional weakness in the affective sphere, this chart shows a number of examples. In these cases there existed hereditary considerations or the definite possession by the individual of what is known as the manic-depressive make-up, that is, a personality abnormally volatile and mercurial in its reactions of an affective character.

On the other hand, there are seven cases in which the hereditary considerations are absent, and in which also it has been impossible to demonstrate a constitutional defect on the affective side. Examining these cases in detail, we find as follows:

## MANIC-DEPRESSIVE PSYCHOSES

Age	Sex	No. of Attacks	Hereditary Constitutional or Mental Considerations	Character of the Attacks	Importance of Precipitating Factor	Diagnosis
29	Female.	1st	Patient has had, and has pulmonary tuberculosis (for two years or more).	Depression.	A keen realization of the perils attending her illness. Married at 16, first child at 17.	Simple depression.
31	Male.	5	Indifferent parents, gave him by adoption to others.	Depression with periods of excitement lasting four or five days. Old attacks usually lasted six or seven months.	Was exiled soon before his last two attacks, both observed by this clinic, from Russia. Separated from wealthy parents and position.	Manic depressive insanity.
54	Female.	2	None.	Agitated depression.	First attack eleven years ago after the death of her son. Second attack began after forced removal from home, where she had lived for many years, with a break in pleasant memories. First attack brought on by suicide of friend. Second attack by death of relative. Impotence probably a sufficient precipitating cause of reaction.	Agitated depression.
17	Male.	2	None.	Depression.	None.	Manic depressive insanity.
50	Male.	1	Impotent sexually for two years. Has enlarged prostate.	Depression.	None.	Simple depression.
49	Male.	1	None.	Agitated depression, ushered in by period of excitement lasting several weeks.	None.	Manic depressive insanity.
23	Female.	1	None.	Depression with great retardation and self accusatory ideas.	None.	Manic depressive insanity.
47	Female.	1	Menopause several months before attack.	Depression, self accusation, ideas of self-punishment. Agitation.	Menopause not a sufficient cause.	Involution melancholia.
28	Male.	1	None.	Depression.	Loss of good position probably sufficient cause.	Simple depression.

## MANIC-DEPRESSIVE PSYCHOSES—Continued

Age	Sex	No. of Attacks	Hereditary, Constitutional or Mental Considerations	Character of the Attacks	Importance of Precipitating Factor	Diagnosis
38	Female.	2	None.	Excitement and depression.	None.	Manic depressive insanity.
43	Female.	1	None.	Self accusatory ideas. Depression, and a feeling that she smelled badly at menstrual periods, and that people noticed and spoke about her. Exacerbations each month at menstrual periods.	No causative relation.	Manic depressive insanity.
37	Male.	1	Markedly alcoholic, dull, won't work. Several months before onset of trouble quit drinking.	Suicidal jump into the river. Acute mental pain, retardation, refusal of food, repeated attempts at suicide. Self accusatory ideas. Hypochondriacal. Somatic delusions, bowels are rotting. Refuses food. Masturbation, retardation. Attempts at suicide.	No exaltation at any time.	Melancholia.
40	Male.	5 in State hospital twice.	Impotence, won't work.		None.	Manic depressive insanity.
35	Female.	2	None.	Semi stupor, cries, nihilistic ideas, suicidal attempts.	None, excepting a severe and prolonged labor with a protracted puerperal period.	Melancholia.
16	Female.	2	Always nervous, restless, unhappy and dissatisfied.	First attack lasted two days. Illusions of snakes and forms at night. Crying, fear of death, precipitated by several days of unusual happiness and elation. Second attack two weeks ago. Insomnia, depression, indifference. Cries and laughs. Incoherent, distractable.	None.	Manic depressive insanity.

## MANIC-DEPRESSIVE PSYCHOSES—Continued

Age	Sex	No. of Attacks	Hereditary Constitutional or Mental Considerations	Character of the Attacks	Importance of Precipitating Factor	Diagnosis
35	Male.	2	Always emotional, bad tempered, quarrelsome.	Depressed and elated moods during past two years.	None.	Manic depressive insanity.
61	Female.	6 or 7	Always moody, at times depressed, other times excited. Has had a number of depressed periods, the longest one lasting two years.	Very talkative, echolalia, distractable, restless, facetious, incoherent.	Last attack caused by death of husband. No apparent cause for other attacks.	Manic depressive insanity.
39	Male.	1	Markedly alcoholic until four or five months before attack. One sister ill in exactly the same way, father peculiar, one brother peculiar.	Insomnia, depression, great bodily fatigue, retardation.	Disappointed in love, probably not sufficient in view of hereditary considerations, to account for the psychosis.	Manic depressive insanity.
15	Male.	1	Was hit in the head by a car 9 years ago. Probably seriously injured in the head. Large left hand, with webbed fingers. Feeble minded.	Depression for two months, then incoherent speech, excitement, insomnia. Excessive sense of well being, grandiose ideas.	None.	Manic depressive insanity, in feeble-minded individual.
37	Female.	4	All four attacks at this clinic, treated and diagnosed as Manic Depressive Insanity. None.	Cries and depressed. Cannot sleep, retarded mentally and physically. Talks of suicide. Is agitated. All attacks depressions. No discoverable periods of elation.	Last attack began three days after friend's death. Not sufficient cause for psychosis. None.	Manic depressive insanity.
45	Male.	3 in Central Islip; on 2 occasions also at Ward's Island.				Manic depressive insanity.



## MANIC-DEPRESSIVE PSYCHOSIS—Continued

Age	Sex	No. of Attacks	Hereditary, Constitutional or Mental Considerations	Character of the Attacks	Importance of Precipitating Factor	Manic depressive insanity.
27	Female.	2 Period of three months.	Began two days after confinement. Had an attack of gripe during last week of confinement.	Indecision, powerless to make up her mind. Bodily and mentally fatigued. Depression, indifference to child. Insomnia.	During first few months of this pregnancy, feared attack which eventually came, as she had had a similar experience with child birth two years ago. Continual conflict with husband during early months over her desire to have abortion performed. Probably not sufficient to account for depression.	Manic depressive insanity.
50	Female.	1	Menopause 6 years ago. Mother always nervous and depressed, worrying disposition. Two sisters and one brother same type. Has aortic stenosis.	Depression, self accusation, retardation, mental pain. Accused daughter of not loving her.	Very slight, quarreled with daughter about keeping a cat in the house. Became depressed and accused herself of being unworthy of daughter's love, etc.	Involution Melancholia.
29	Female.	1	Father and two sisters and two brothers died of Tuberculosis.	Depression.	Death of members of his family in rapid succession. Surely sufficient cause for depression.	Simple depression.
27	Female.	1	One sister suffering from manic-depressive insanity at Kings Park. Patient has always been moody, usually happy, although has had frequent periods of depression.	Restlessness, desire to wander. Depression, retardation, indifferent toward husband and child. Sense of insufficiency. Fatigue, Ideas of impending doom, etc.	One year ago husband sold farm, came to New York to live and had a bad time earning living. Worried about sister who was also insane. Probably sufficient to cause depression, although undoubted constitutional features are present.	Manic depressive insanity.

In the first case the patient, a previously healthy, happy, social individual, only recently married, full of the joy of living, becomes stricken with pulmonary tuberculosis. Before the disease is discovered, considerable inroads are made on her health and a keen realization comes to her of the seriousness of her physical condition. In such a situation, it seems perfectly natural to postulate the possibility that the depression which results is not an abnormal depression, but one really quite within the bounds of the normal depressive reaction, which might follow such a stunning blow as she had received.

In the second case, despite the fact that the patient has had two attacks, it seems demonstrable that a sufficiently serious precipitating cause has existed on both occasions, in the absence of hereditary considerations and in the absence of any anomaly of the personality of this individual. The first attack followed the death of an only son eight years ago. This son was born and bred in the home from which she was forced to remove several months before she came to the clinic with her second attack. The home, besides having been associated with many pleasant memories of various kinds, had been filled with memories of her only child, and it seems reasonable to suppose that the forced removal under distressing circumstances was sufficient to recall a host of sad associations and give her the start for a second attack of depression. This patient improved considerably in a few months, and has now been well and a useful housewife for over a year.

In the third case, a middle-aged man of 50, an Irish laborer, suddenly became impotent when he was 48 years old. Brought up to expect nothing but ridicule and condemnation from anyone who might know his secret, he worked himself into a fearful, apprehensive, depressed state about his sexual weakness. The depression, while profound enough to make him uncomfortable, did not prevent him from working, and it seems unlikely that once the psychical and mechanical cause of his impotence are removed, that he will be nothing but the jolly, whole-hearted Irishman that he has always been. The man suffers from a severe prostatitis and cystitis which is being treated in the genito-urinary clinic, and he is gradually improving physically and mentally.

The fourth case was also an Irishman, a young man of 28, who had held a responsible, well-paying position, and had lost it through no fault of his own. He was about to marry and the loss of his position disarranged a number of plans that had been made a long time before. He reacted by becoming depressed, physically and

mentally dull and retarded, and by an annoying lack of energy and a positive aversion to thinking in any form. He cleared up promptly within a few weeks.

The fifth case was a man who had been an extremely shiftless, inefficient individual, very markedly alcoholic until one year ago. He had forced a bright, 17-year-old son to leave school where he was preparing for one of the professions, to go to work in order to earn more money for him to spend in his excesses. He suddenly stopped drinking a year ago and felt keenly the shame of his actions. He also realized that he had wrecked the boy's opportunity, for whatever money he had saved toward the boy's education had gone. He suddenly jumped into the East River in a depressed moment, and was saved with difficulty. Despite this he continued working until four months before his visit to the clinic, when he quit because his thoughts were so painful and he was so agonizingly depressed that he could not work for three days. At the end of this time he forced himself to go back to work and only quit a few days before his first visit to the clinic, because he feared he might do himself harm while working. This patient had always been fairly alcoholic and it is impossible to determine whether or not he had similar attacks or had periods of exaltation and excitement during his alcoholic debauches, which were not recognized as such, being entirely masked by his alcoholism. Therefore, one cannot positively say whether this is a case of simple depression plus alcoholism, or whether it is really a case of manic-depressive insanity with a constitutional defect on the affective side. The fact remains, however, that this patient cleared up rather rapidly and became efficient and worked steadily at the end of a very few weeks' treatment.

The sixth case was a woman who had become semi-stuporous following a severe labor, which was followed by a long period of convalescence, during which she worried a great deal about the expense that she had been to her husband, and her lack of power to administer to the needs of her family. She suddenly became semi-stuporous, almost mute, cried and talked of suicide and of killing herself and her family and relatives, so that they would not be in continual misery about her constant ill health. This patient, under active, medical treatment and rest, became well and was not seen after a few months, being discharged, very much improved.

The seventh case was a woman, age 29, whose father, two sisters and two brothers died in rapid succession within a few years of pulmonary tuberculosis. Following this series of profound shocks,

she became depressed, could not work; thought and movement and action of any kind became extremely difficult for her. She was powerless to make up her mind, did not care for food, did not sleep well, etc. Surely, this patient had more than sufficient cause for her depression. While she was depressed enough to almost lose contact with the environment and the reaction was profound enough to necessitate treatment, yet this patient recovered within three months and has remained perfectly well mentally since.

We find that the foregoing cases, at least six out of seven are mild depressions, not sufficiently severe as to their psychiatric manifestations to warrant even the old term melancholia. These attacks occurred in apparently normal individuals after loss or bereavement of a really serious nature, from which all of these patients eventually recovered within a comparatively short time.

The degree of mental illness in these cases was not very profound, and in none of the cases had the patients lost touch absolutely with their environment. In fact, most of them remained at work or did not work for only very short periods. It will, of course, be interesting to watch these patients for a long period of time in order to see whether they have recurrences. The time which has elapsed since the attack has not been long enough to make an observation worth while.

That there is a difference between these cases and the typical manic-depressive cases as conceived by Kraepelin, Tanzi, Hoch, Meyer and others, seems to be undoubted. These patients just described clearly lack the unstable, emotional make-up of the manic-depressive, of which the following is a good example:

This man is a Russian, age 31, who had had several severe conflicts to contend with over a long period of time. He was one of a large family. His father and mother, although quite wealthy and holding an exceptionally comfortable position in Russia, gave him over by adoption to some friends when he was quite young. He has always felt rather keenly the slight which his parents showed him when they picked him from a large family for this sacrifice. Despite this, however, he grew to an active, efficient manhood, took a prominent part in the politics of the region in Russia where he lived and finally became so active that he was exiled to Siberia. Here he suffered a great deal of privation, often actual torture, and after his release was forced to leave his wealthy parents in Russia and had to come to this country penniless and without a friend. His first attack in this country began shortly after his landing here with a mild depression. There has never been any period of elation and the patient has practically continued depressed until what

we call his second attack, which is a little more severe and puts him out of touch with his environment quite a great deal more than his first one. However, in the intervals between his first depression after his arrival in this country and his present attack, he married a woman quite beneath his station. They have suffered together a great deal of want and misery, to which he certainly is not accustomed. He has grown homesick and eventually greatly depressed, because of the fact that he cannot go back to his family in Russia.

Repeated examination of this patient and his relatives brings out the fact that this patient has always been highly excitable, extremely energetic, an active political worker, addressing himself to the correction of the wrongs of his fellow citizens in Russia, and one of the rather common type of idealistic socialists which one finds so frequently in his country. He has always been impatient of correction, extremely sensitive, and has given way a number of times since he was a young man of 21 to long periods of depression, lasting anywhere from three weeks to three or four months, his present attack since he has been in this country lasting almost two years. The first serious attack which required treatment followed his banishment to Siberia at the age of 21. This attack lasted several months. In 1905 he had another attack in the same place and still another attack of depression in 1909, with others in 1912-15. In the intervals between his attacks, he has been extremely proud and sensitive. He relates that several times his parents have come to claim him from his adopted parents, but he has spurned them and reviled them for their unusual treatment of him. The patient has been practically continually depressed since he came to this country, and married his wife because he desired someone who might sympathize with him. He has not been able to adapt himself to the unprosaic, plain, everyday, workaday life of the lower East Side and has almost continually been depressed since he came to this country two years ago. He has not been able to work more than a few months during all this time.

Here we have a case of a patient who has been unstable practically since boyhood with distinct periods of depression. He has had in the intervals periods during which he is exceedingly energetic, extremely emotional, high spirited and optimistic. Never since his boyhood has this man been able to strike a normal mood of an even average degree of affectivity nor has he been able to balance activity and rest, happiness and unhappiness in healthful quieting proportions. This, of course, is the manic-depressive type so well described by psychiatrists and is undoubtedly pathological.

*(To be continued)*

## Society Proceedings

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### NEW YORK NEUROLOGICAL SOCIETY

THREE HUNDRED AND SIXTY-EIGHTH REGULAR MEETING, HELD  
AT THE ACADEMY OF MEDICINE, DECEMBER 3, 1918

The President, DR. FREDERICK TILNEY, in the Chair

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#### ANEURISM OF BASE OF SKULL

Dr. S. Philip Goodhart presented a case of intracranial infiltrating aneurism at the base. The patient was a middle-aged woman who gave a history of long-standing rheumatic disorder for which she had taken a number of cures. There was at present evidence of arthritis in the joints, especially of the hands and feet. She had also suffered from headaches, mostly confined to the left side of the head. Three years ago these headaches suddenly became intense and persistent and were accompanied by a ringing sound in the left ear. To this ringing were finally added noises of different character which after a period of six weeks eventually involved also the right ear. The patient noticed that the headache was less when lying down, and she noticed that she could diminish the noises in both ears by pressing deeply into the soft parts of the neck slightly below and a little anterior to the left ear, manifestly over the carotid. This also diminished the headache to a large extent. The left eyelid was edematous in the morning. There was a point of tenderness over the left mastoid. There was hyporeflexia of the cornea and a relative diminution of all forms of sensation all over the left half of the body, doubtless purely functional. Objectively, on auscultation a distinct bruit was heard behind both ears; with the aid of a soft rubber stethoscope a loud bruit could be heard in the right ear synchronous with the pulse. The eye grounds were practically normal. Systolic blood pressure was 130, diastolic 80. Roentgenologic examination revealed no abnormal bony changes. The case was probably one of intracranial aneurism and probably at the base posteriorly.

Dr. L. Pierce Clark remembered seeing a woman last spring who had an aneurism of the left frontal sinus and acute exophthalmos. The condition was diagnosed first by an ophthalmologist. The ear bruit on auscultation did not decrease on sitting up; in fact it was intensified and



she had violent vertigo in lying down. This condition was rarely diagnosed. The speaker had seen but two other cases. The only thing to be done was to use the iodides, but one patient got on better by using morphine.

Dr. Charles A. Elsberg remarked that he had seen a metastatic new growth give exactly the same symptoms as those of Dr. Goodhart's patient.

## A METHOD FOR IMPROVING THE TREATMENT OF FACIAL PARALYSIS

Dr. Charles H. Jaeger presented a child who three years ago had a complete left facial paralysis. Following orthopedic principles which had been found to be sound in poliomyelitis, it was decided to rest the muscles, avoid irritation and motion and prevent distortion. When the case was brought to Dr. Jaeger, he decided that here was a chance to see what complete rest and maintaining the physiological position and shape of the muscles would do to restore the normal tone of the muscles. The problem seemed to be one of holding up the affected muscles permanently. The simplest thing was to have some sort of a net made into a cap to fit snugly over the head and then to apply a brace consisting of two strips of adhesive plaster with attached ribbons, the ends of which could be tied into the net cap, while the cheek was drawn up to correct the sagging: or a small hook could be slipped into the net cap. This procedure was followed, the child willingly coöperating in the treatment, and the attachment, with frequent renewals, was worn constantly for three months. Within one week after applying the brace, the condition showed signs of improvement. The facial expression had become more natural, there was less drooping of the left corner of the mouth and the left eyelid could be more nearly closed. At the end of three months the child was entirely cured. She was not seen again for nearly two years, but three weeks ago her mother had brought her to Dr. Jaeger's office with a history of Spanish influenza and a return of the paralysis.

Dr. J. A. Booth considered that Dr. Jaeger's arrangement of the adhesive plaster, instead of a hook to fit in the corner of the mouth, might be an improvement in a method of treatment that had been in common use for years.

Dr. L. Pierce Clark said that after all it must be remembered that however severe facial paralysis might seem, the great majority of these cases practically all recovered spontaneously. It was only in the severest grades that one might expect contractures to evidence themselves, and then the majority of the contractures were in the line in which the splint was here applied. It might be well to try and see what this method would do to overcome the marked sagging following mastoid

disease and injuries of the face of severe grade. In regard to hyperglossal anastomosis, regarding the relative improvement in Bell's palsy, Sir William Gowers said that whenever the paralysis was shown, by electrical reactions, etc., to have existed over three months, some part of the function of the seventh nerve would remain lost. He had a patient, a man, who had his beard so trimmed by a tonsorial artist as to make both sides of the face appear symmetrical and the improvement was so great that his own friends did not know he was paralyzed.

Dr. William M. Leszynsky did not consider Dr. Jaeger's analogy between the paralyzed facial muscles and those of an extremity affected by poliomyelitis a good one, but for many years he had been accustomed to recommend the use of a small hook to be inserted at the angle of the mouth, and retained in position by a thin strip of adhesive plaster fastened over the malar bone during the early stage of facial palsy, in order to give support to and prevent stretching of the paralyzed zygomatic muscles. He thought that Dr. Jaeger's idea of the application of the plaster to the skin in order to elevate and support the upper lip was preferable to the hook which occasionally set up irritation of the mucous membrane. The additional strip of plaster over the masseter, as demonstrated in this case, however, was superfluous and could be dispensed with. It should be remembered that in many cases which appeared severe at first, recovery might take place spontaneously. If recovery in bad cases could be hastened by simply keeping the paralyzed muscles at rest indefinitely, then all of the customary methods of treatment, such as electricity, massage, etc., could safely be discarded. Attempts on the part of the patient at voluntary effort to move the facial muscles had always proven one of the most important measures leading toward ultimate recovery of function.

Dr. A. P. Lensman, of Seattle, Wash., having had a unilateral facial paralysis himself, had tried every method to correct it, with the exception of the use of adhesive plaster, and his personal experience was that rest was not an effectual method of treatment. He had a great deal more success with diathermia, though it did not have any effect on the ptosis. The discomfort of the condition came more from the contraction than from a nerve pain, and the patient always felt very much better for some time after massage. The principle of rest for contracture did not appear to be a physiological measure. It might be that the use of the adhesive plaster itself, its composition, had some effect on the circulation and thereby brought about the result achieved by Dr. Jaeger, but that a cure was effected by the immobility produced by the brace itself would seem to be doubtful.

Dr. Smith Ely Jelliffe said in response to Dr. Leszynsky's suggestion that "if this form of treatment be effectual we will have to lay aside all our old methods of handling these paralyses," that he hoped that we would wake up and learn that the older methods were inadequate, if not stupid, for physiological stimulus of muscle action was not obtainable

by the old methods of massage and electricity. Real stimulus was received through the motor cortex through ideation. In recent experiments in the physiological laboratories where extensive studies on the peripheral nerves had been carried out, they had shown that electrical stimulus was not a stimulus at all, and that degenerated nerve processes were not helped in the slightest by electrical stimuli.

Dr. Richard B. Kruna said the effect of massage was the accomplishment of concentrated rest, as elimination of the products of fatigue thereby took place considerably more quickly than if the muscle were left to itself. Neither rest alone or stimulation alone would accomplish what one wanted to achieve, but a combination of the principles of stimulation and of concentrated rest by massage and the principles of ideation together had to be utilized. In the treatment of infantile paralysis a combination of the three often gave a better total result than under the application of any single method.

Dr. M. Neustaedter asked what was the condition of the palpebrarum.

Dr. Jaeger, in closing the discussion, expressed his gratification that the subject had aroused so much interest from the society. He himself felt that as this was merely a single experience, one could not from this make general rules or laws governing the treatment of all cases, especially those of nerve injury during a mastoid operation. He presented the child to show results in this particular case where electrical stimulation had been carried out for almost a year without benefit, and the opposite of this treatment, or complete rest, had brought about the most satisfactory results.

There was absolutely no similarity between this method of broad external support and Dr. Leszynsky's method of dragging up the cheek by means of a small hook placed in the corner of the mouth and fastened over the ear. The latter was unphysiological: it produced traumatism to the already weakened muscle by attempting to carry the entire weight of the cheek on the very small area engaged by the hook. Dr. Jelliffe's remarks coincided with his own views about the regeneration of muscle, i. e., that it must be a central regeneration and that the muscle should not be regarded as a single entity but in its relation with the brain and cord. It was one organ in three parts, and one could not, by applying external stimulation, expect regeneration from the muscle when the normal physiological process was ideation and central stimulus. That was the modern treatment of poliomyelitis, and that was the way in which the speaker expected to continue to treat cases such as the one he presented. The two plasters were applied for a very definite reason: the first plaster was placed over the affected muscle, the second alongside of it to assist in supporting the weight of the cheek.

## TEN YEARS OF WORK OF THE NATIONAL COMMITTEE FOR MENTAL HYGIENE AND SOME PLANS FOR ITS FUTURE DEVELOPMENT

Mr. Clifford W. Beers, founder and secretary of the National Committee for Mental Hygiene, delivered this address. He began with a brief explanation of why he published his autobiography, "A Mind that Found Itself," which was a frank description of conditions as he saw them while a patient in hospitals for the insane from 1900 to 1903. His motive in publishing his book was to organize a movement to improve these conditions and to help prevent mental disorders. Following this, he was instrumental in organizing a society with these aims in view and to do work similar to that done by another national agency in the fight against tuberculosis. The success of the National Committee for Mental Hygiene, which was founded in 1909, had in part been due to the fact that it did not antagonize the hospital officials, but gained their coöperation by proving to them that it was working also in their behalf. The preliminary plan was formulated in 1906 and in 1907 the speaker got in touch with Dr. Adolf Meyer who believed that results could be obtained by inducing a group of psychiatrists and others to participate in forming a national committee, the purpose being to improve conditions among the insane and to institute methods for the prevention of mental troubles. In considering a title for the committee, the inclusion of all these words would have proved unwieldy and Dr. Meyer suggested the use of the phrase "mental hygiene," which proved to be a very happy choice, as it included the idea of prevention.

It was not an easy matter to organize the National Committee for Mental Hygiene. The organization was founded, as stated, in 1909, but it was two and a half years before funds for initiating the work were secured. Mr. Henry Phipps then contributed \$50,000 for the first three years of work, and Dr. Thomas W. Salmon who, during the war, had been in France in charge of the neuropsychiatric work of the American Expeditionary Forces, was appointed Medical Director.

There were many difficulties encountered in beginning the work, as there was no other organization's experience to draw upon. In consequence the first task was to gather reliable data regarding a variety of subjects. The most immediate necessity that presented itself was to get accurate information regarding the institutions for the insane. Before very long a wealth of information poured in.

The fact that the initial work was under the direction of Dr. Salmon was very fortunate. He at once won the confidence of everyone with whom he dealt. The managements of the various hospitals welcomed the help of the committee and extended every assistance. The next work attempted, after gathering the information and starting the library, was that of surveys. The method of making these was to send a well-trained psychiatrist into a state to make a personal study of the situa-

tion, yet not necessarily to look for abuses. The committee did not resort to unwise publicity by over-featuring shortcomings, but tried to enlighten the public as to actual requirements so that, when necessary, new laws should be enacted. Twelve or fifteen surveys had been made to date, with funds provided for that purpose by the Rockefeller Foundation, except in South Carolina, Texas, Wisconsin and Pennsylvania, which were financed in other ways. After a report of the conditions existing in South Carolina was made to the Legislature of that State, it appropriated \$500,000 for a new institution, and to-day South Carolina has a modern state hospital, whereas prior to that conditions were on the same low scale that obtained fifty or more years ago. The people of Texas made an appropriation of \$600,000 for the remodeling of one old institution and the building of one new one, for it had been found that for lack of places to care for them the insane were held in jails and almshouses. Similar conditions were common in other states, which, fortunately, however, were fast decreasing in number. It was the hope of the committee that in time the entire country might be surveyed. If funds for this sort of survey work continued to be available, it would be possible to put an end to the so-called legislative investigations which did more harm than good, as surveys made such legislative investigations unnecessary.

The activities of the National Committee also included work in behalf of the feeble-minded. Indeed, this phase was developing more rapidly than any other. Surveys, as was to be expected, formed an important part of it, and far-reaching effects were being produced in a number of states. Another special activity consisted of the studies in the psychopathology of crime. Many of those present were familiar with the work of Dr. Bernard Glueck at the Psychiatric Clinic at Sing Sing Prison, which had been supervised and financed by the National Committee. His studies led him to the conclusion that mental factors were the main ones in the problem of crime and must be considered in any efforts at prevention of crime. The work done at this clinic had already influenced the management of crime in these states.

Another activity lately started was the Bureau of Uniform Statistics of the National Committee. Statistics of mental diseases were most inadequate, and in addition had heretofore not been gathered on a uniform basis. Within the past year, however, 144 of the 1,500 hospitals for the insane in the United States had agreed to use uniform statistics blanks, all of which were sold to them at cost by the committee. The work was also being extended into Canada, where the idea was cordially welcomed. In time dependable statistics on mental diseases would be available.

These were some of the committee's special activities. The National Committee was carrying on educational propaganda, which was having its effect, not only among physicians, but among the general public. Mental hygiene exhibits had been found to be most useful in enlighten-

ing the public, as were public lectures. It was the intention of the committee to create as soon as possible new exhibits with duplicate sets for lending purposes.

When the phrase "mental hygiene" was adopted more was accomplished than was realized at the time. The solution of the problems of feeble-mindedness, prostitution, vagrancy, delinquent children, were all included under the term "mental hygiene," so the scope of the work originally planned had been greatly extended.

Because the National Committee was already in existence when the United States entered the war, it was used as a rallying point and was able to lay out plans for the United States Government in providing proper care for the nervous and mental cases in the army. Through the war work of the committee some 50,000 recruits had been rejected for various nervous and mental conditions, and the analyzing and classifying of these cases would provide wonderful material for research into the causes of these conditions. The war had undoubtedly done a great deal for the sciences of neurology and psychiatry, especially in the way of securing public recognition of their importance.

Some eighteen state societies for mental hygiene had been organized in this country and a number of states. It was hoped that within a few years all states would be organized, and all of them would have such agencies. Furthermore, an international movement had been begun. The speaker had personally organized the committee in Canada, where he met with the most enthusiastic coöperation, some of the most prominent people in the Dominion having taken a personal interest in getting the work under way. Meetings were held at Quebec, Montreal, Toronto and Ottawa, and everywhere the movement was most cordially endorsed. A report had lately been received from the Canadian National Committee, which was only six or seven months old, showing wonderful results. It was doing war work, carrying on studies of different kinds, notably in regard to immigration and the correction of laws, and in regard to juvenile delinquents, etc. After ten years of work it might safely be predicted that the mental hygiene movement had come to stay and that it would in time spread to all parts of the world.

Dr. L. Pierce Clark said that Mr. Beers had presented the problems confronting the Committee for National Hygiene and the work they were doing in so fascinating a manner and so completely that there was hardly anything left to be said. It was surprising to note what they had accomplished while laboring under the disadvantage of being so short-handed and having such a small amount of money, and yet the good will and good offices of the different members of the committee were always generously furnished. Dr. Salmon had once said he hoped the time would come when the committee would get all the obvious work done through laymen and the medical profession as a whole, and then be able to turn its attention to research and investigation. Of course,



there had already been reasearch and investigation in the directions mentioned by Mr. Beers, but there was still considerable to look forward to in the functions medical hygiene would meet in the domain of research. One of the most important functions in future of the National Committee should be to search into the nature of the economic and social factors that played a rôle in the induction of mental disorders. To carry this out to best advantage, there should be mental hygiene clinics where all types of conduct disorders could be investigated and treated upon the basis of their causative defect. The scope of such a clinic should embrace such general conduct disorders as defective nursery ethics, disorders of puberty and adolescence, and lying, thieving and swindling, before they advanced so far as to require legal measures. Unfortunately, in the past many of these cases had been sent to medical clinics where they were not given proper attention, as they had only too frequently been considered as non-medical. There should also be departments in the clinics which would deal with defective adaptations in the domestic relations, and with economic and social maladjustments. The coming need at present, so far as could be foreseen, was to socialize a part of the psychiatric activity outside the institution and clinic per se, and make it a real part of the community life. It had already been learned that one had to reach the individual at an early period of life, and therefore earnest attention should be given toward reaching back in point of time toward the earliest life of the psychopathic individual, so it was worth while considering whether the Committee for Mental Hygiene could not establish an ideal type of clinic of mental hygiene to be worked out first in some large city. Educating the school children should be handled scientifically and an effort made toward a better attitude and relationship to society as a whole. Some of the functions of mental hygiene were gradually being extended in the courts. To do this work, there had to be trained workers. The social workers, the individuals who had cared for society's psychiatric attitude toward the public, needed to be augmented. There was opportunity here for the after-war activity of the intelligent men and women who had been engaged so earnestly in war work committees, Y. M. C. A. enterprises, etc., and from them would come a great revival of humanistic interests helping the whole problem of mental hygiene in research as well as in practical activity. If this idea could be arranged and developed it would serve a great function for the future and would prove of benefit to the whole community as well as those psychopathically inclined. It was time for the fields of psychiatry and neurology to be regenerated, and this could come through an extension into peace conditions of the reconstruction planned during war.

Dr. Smith Ely Jelliffe said that from the beginning of the movement which Clifford Beers started, he had felt, in watching its gradual evolution, that a real genius for this type of work, an account of which has been epitomized here to-night, was with us, and in all activities of our

related societies he felt sure that no one could do more than to lend hearty support and coöperation to work so ably started and so ably carried on.

## BOSTON SOCIETY OF NEUROLOGY AND PSYCHIATRY

REGULAR MEETING, HELD NOVEMBER 21, 1918

DR. CHARLES G. DEWEY, President, in the Chair.

### INTRAVENTRICULAR TREATMENT OF NON PARETIC NEUROSYPHILIS

DR. KARL MENNINGER presented this paper which was elaborated in conjunction with Dr. A. L. Skoog and which will appear in an early issue of the *JOURNAL OF NERVOUS AND MENTAL DISEASE*. Led by the workers who have tried to improve the condition of paretics by intraventricular therapy these authors worked on a number of other types of syphilis, notably a number of hemiplegics. There were a number of patients who showed considerable improvement, the details of which will appear in the paper to be published.

*Discussion.*—DR. P. C. KNAPP said that he had almost uniformly seen some improvement from the results of intraventricular treatment and expressed the opinion that this method should be used more widely. In his opinion hemiplegics might be helped, he had seen one such result. Headaches, according to Dr. Knapp, were not as often observed following intraventricular treatment as after the intraspinal procedures. He said that he would not state an opinion as to the meningeal irritations liable to be set up and which had been referred to in the paper.

DR. FARNELL spoke of the great improvement that not infrequently had been seen in forms of non paretic neurosyphilis under the more usual forms of treatment and wanted to know just why the treatment should be advocated and under what conditions. Turbid spinal fluids which had resulted from the intraventricular treatment were an interesting finding and he was desirous of knowing how they came about.

### DIAGNOSTIC PROBLEMS IN PSYCHIATRY

DR. L. G. Lowrey presented this paper and spoke of the difficulties of psychiatric diagnosis inasmuch as very complete and detailed studies were necessary. He first contrasted the snap diagnoses made by a junior admitting officer and those arrived at after more complete analysis by the various members of the staff. The percentages of the various statistical results given by him in great detail are of little interest unless

a more detailed setting forth of the criteria by which the nosological system used were devised. Dr. Lowrey had already reported on this phase of the problem and in a contribution already made—[see *Medicine and Surgery*, March, 1918] on *An Analysis of the Accuracy of Early Psychiatric Diagnoses* presented the figures on 2,000 admissions to the Boston Psychopathic Hospital based on the standards of Southard and Stearns [*Bost. Med. and Surg. Jl.*, Dec. 10, 1914]. In other words the diagnosis was correct or incorrect if on later examination it agreed or disagreed with the dicta of Southard and Stearns. Dr. Lowrey's paper raised the question as to what is a correct diagnosis, but made no step to answer it. All diagnoses are on ultimate analysis systems of agreement between people. The diagnoses of one decennium are notoriously different from those in another. This question was raised by Dr. Knapp in the discussion. What is a diagnosis? Shall it be a pathological one, an etiological one, or a symptomatic one? Shall the pragmatic attitude of therapy go along with the diagnosis and establish its features? These questions Dr. Lowrey did not dispose of but assumed the system mentioned and according to that the diagnoses were correct or not correct. Hence his figures were not particularly illuminating without the criteria which establish "correctness."

## Current Literature

### I. VEGETATIVE NEUROLOGY

#### 1. VEGETATIVE NERVOUS SYSTEM.

Ranson, S. W., and Billingsley, P. R. SUPERIOR CERVICAL GANGLION AND CERVICAL PORTION OF THE SYMPATHETIC TRUNK. [Jour. Comp. Neur., 29, Aug. 15, 1918.]

This is a second paper in this interesting series of papers dealing with the vegetative nervous system and its connections with the sensorimotor system. Most of the paper is devoted to the histological details of the differing types of cells of the superior cervical ganglion but a number of interesting points are brought out and some of the correlations emphasized; the article is well illustrated. Attention is chiefly directed to the cephalic end of the sympathetic trunk and the superior cervical ganglion. The authors' own experiments, as well as the previously reported experiments with nicotine and degeneration methods, shows that the cephalic end of the sympathetic trunk consists of pre-ganglionic fibers arising in the upper segments of the spinal cord and terminating in the superior cervical ganglion, and that the cells located in this ganglion give rise to fibers which run to terminate in the glands and smooth muscle of the head. In fact, the cephalic end of the sympathetic trunk consists almost exclusively of fine medullated fibers, most of which vary in size from 1.5 to 3.5 mm. These fibers degenerate in an ascending direction after section of the nerve. In pyridine silver preparations no unmyelinated fibers can be distinguished in the normal sympathetic trunk at this level except for some fine branches of distribution from the superior cervical ganglion which happen to be included for a short distance in the same sheath in that nerve. The authors' observations, with those of Langley's, show that superior cervical and stellate ganglia are not connected by myelinated commissural fibers and that unmyelinated commissural fibers if present are few in number. Experiments conducted by Langley failed to show any evidence of commissural fibers joining these two ganglia. Psychological and histological evidence is also against the presence of afferent fibers in the cervical portion of the trunk. The nervus caroticus internus in the cat contains, in addition to great numbers of unmyelinated fibers, a very considerable number of fine myelinated fibers, mostly from 1.5 to 5.5 mm. in diameter. The fibers in this nerve do not degenerate after section

of the sympathetic trunk in the neck; all or nearly all of them are postganglionic fibers with their cells located in the superior cervical ganglion. The dendrites of the cells in the superior cervical ganglion are of two kinds, intracapsular and extracapsular. The intracapsular dendrites are rare in the sympathetic ganglia of mammals but abundant in the human superior ganglion. Here they give rise to the complicated subcapsular formations that have been designated as dendritic crowns and glomeruli. A glomerulus may be formed from the dendrites of a single cell or from those of two or more cells and is designed accordingly as an unicellular, bicellular, tricellular, or multicellular glomerulus. The extracapsular dendrites are long-branched processes which run in every direction among the ganglion cells. In pyridine silver preparations it is not possible to follow them to their true terminations. They have summarized Michailow's account of the termination of these dendrites in preparations stained with methylene blue and illustrated them fully. The dendrites of one cell may form baskets or other special endings about neighboring cells, but these dendritic endings seem to be always outside the capsule of the second cell and therefore could not transmit impulses to it. Sensory neurones, with long dendrites have been described in this sympathetic ganglia by Dogiel, but a review of the literature on this point shows that his interpretation of these structures has received little support from the observations of others. It is also doubtful if the axons of cells in the sympathetic ganglia run to spinal ganglia to form baskets about the cells located there. The axons of sympathetic ganglion cells may acquire myelin sheaths, but usually do not. A study of the literature would indicate that they usually run, without giving off collaterals, into one of the branches of distribution arising from the ganglion. Some run through a connecting nerve to another ganglion, but there is no evidence to show that they ever end there. It would seem more likely that these fibers merely run through this second ganglion to join the nerve to which they are distributed. Some postganglionic fibers give off collaterals either in the original ganglion or in a second ganglion through which they pass, but these collaterals have been shown by Michailow to have endings not well adapted for the transference of nerve impulses. Between the cells is a rich plexus of fine axonic ramifications, which is formed by the branching of preganglionic fibers. This disappears when the preganglionic fibers degenerate. It is probable that many of the fibers of the intracellular plexus form synapses with the dendrites of the sympathetic ganglion cells. In pyridine silver preparations of the superior cervical ganglion of the cat it is possible to trace the darkly stained preganglionic fibers from the sympathetic trunk and to see that they undergo repeated branching and take a large part in the formation of the intercellular plexus. The postganglionic fibers, which are more lightly stained, and for the most part devoid of branches, take only a minor part in the formation of this plexus, but become grouped

into bundles of parallel fibers which run toward the branches of distribution of the ganglion. There is no evidence for the existence of synapses, either commissural or sensori-motor, between the neurones located in the ganglion and there appears to be no mechanism for a diffusion of incoming nerve impulses to all of the cells nor to all of the cells of a given function within the ganglion. Evidence furnished by nicotine and degeneration experiments shows that all the synapses between the pre- and post-ganglionic neurones on the pathway through the superior cervical ganglion are located in that ganglion. There are no ascending postganglionic fibers in the cervical portion of the sympathetic trunk and no preganglionic fibers are continued through the superior cervical ganglion into the branches of distribution. The pre-postganglionic synapses seem to be of two kinds: (1) pericellular networks and (2) relations established between the dendrites and axons in the intercellular plexus. One preganglionic fiber activates several postganglionic neurones. The dendrites of the post-ganglionic neurones serve to increase the complexity of these relationships and may aid in bringing two or more neurones under the influence of a single axon. [Jelliffe.]

**Sollier, P., and Courbon, P.** SYMPATHETIC DISTURBANCES IN THE UPPER EXTREMITIES DUE TO CONCUSSION OF THE CERVICAL CORD. [*Presse médicale*, Dec. 19, 1918.]

These authors state that edema limited to a certain segment of a limb must not be considered as malingering. Segmental edema may also occur as the chief objective sign in certain cases of trauma of the cervical spinal column. They here report four wound cases in which, following bullet injuries of the neck, edema of the hand and fingers developed so circumscribed as to suggest previous application of a constricting band around the limb. In the first case a quadriplegia which passed off in two weeks was at first noted. Upon examination six weeks after the injury, the patient's hands showed a pale pink swollen condition, rather tense, slightly hot, with sausage-like fingers, and the skin of the palms dry and cracked. There were no motor nor superficial sensory disturbances and the electrical reactions proved normal. Further examination, however, revealed mydriasis, especially marked on the right side; loss of deep sensibility of the fingers, astereognosis, and ataxia of the hands when the eyes were blindfolded; slight ataxia of the lower extremities, and exaggeration of all the osteotendinous reflexes in the limbs. These conditions definitely indicated a disturbance of the long radicular fibers of the posterior column of the cord rather than an injury of the sympathetic chain or rami communicantes. The therapeutic results likewise bore out this conclusion, weekly X-ray exposures over the nerve cells of the sympathetic system of the upper extremity, viz., from the eighth cervical to the eighth dorsal, almost completely



dispelling the disturbances in seven sittings. The authors recognize, however, that such disturbances may result from involvement of either the intraspinal nuclei of the sympathetic or of the radicular pathways of the latter. The actual pathological condition is believed to be a hematorachis slightly compressing the posterior aspect of the spinal cord or the nerve roots.

## 2. ENDOCRINOPATHIES.

**Fujimoto, B.** RED AND WHITE CORPUSCLE COUNT, FERMENTS, AND SUGAR CONTENT OF BLOOD AFFECTED BY SECRETIN. [*Am. Jour. Physiol.*, Dec., 1918, 47, No. 3, p. 342.]

This author found in rabbits that secretin, subcutaneously injected, produces an increase in the red and white corpuscles in the blood. Hypodermic injection of 1 c.c. of secretin causes an increase in the catalase content of the blood, but the diastase, glycolytic ferment and sugar remained unaltered.

**Léri, Andre, and Perpère.** LOCALIZED PERISCAPULAR MYOPATHIES. [*Presse Médicale*, 1918, XXVI, p. 320.]

The writers describe a form of spontaneous myopathy, limited to the periscapular muscles, which they claim is not very uncommon. It is specially localized in the trapezius and the serratus magnus, sometimes in the rhomboids, supraspinatus, infraspinatus, and pectoralis major, exceptionally in the deltoid. These muscular atrophies have all the clinical and electrical characters of the myopathies. They have no relation to any known infection or intoxication, to articular affections, or to any injury. They appear to show no tendency to spread to other muscles or to progress at all. They must be regarded as localized myopathies. [Leonard J. Kidd (London, England).]

**Chistoni, A.** THE ANTAGONISM BETWEEN THE ACTION OF EXTRACT OF LYMPH-NODES AND THAT OF ADRENALIN ON ORGANS CONTAINING MUSCLE. [*Arch. Ital. de Biol.*, 1918, LXVIII, p. 128.]

The writer has studied the action, on isolated organs containing unstriated muscle, of extracts, prepared by Marfori's method, of the mesenteric, inguinal, bronchial and cervical lymph-nodes of the calf, ox, horse, dog, cat and man. He finds, as Marfori did, that extracts from young animals are more active than those from old ones. In every organ studied, including the esophagus of the toad and the fowl, the small intestine of the dog, cat, and rabbit, the virgin or pregnant uterus of the guinea pig, dog, or cat, and the coronary arteries of the calf, there is an antagonism between the action of extracts of lymph-nodes (Marfori's "lymphogangline") and that of adrenalin. The action of lymphogangline is manifested on the nervous system and not on the unstriated muscle fiber itself. Chistoni agrees with Marfori that

lymph-nodes secrete a substance, probably a hormone, whose action is in all respects antagonistic to that of adrenalin. [Leonard J. Kidd (London, England).]

**Marfori, P.** THE HORMONIC FUNCTION OF LYMPH-NODES. [Arch. Ital. de Biol., 1918, LXVIII, p. 113.]

The writer has studied the action of extracts of the mesenteric lymph-nodes of the calf and other mammals on the heart, blood vessels, and pupil. To these extracts, which contain one or more active principles, he gives the name "lymphogangline." Lymphogangline acts on the heart by depressing the tonus of the sympathetic apparatus, and consequently by slowing the cardiac pulsations in the atropinized heart of dogs and in the isolated heart by Langendorff's method. It has no influence of the tonus of the inhibitory apparatus. On the systemic blood vessels it acts by lowering sympathetic tonus, and causes a vaso-dilation of short duration which can be repeated by a fresh injection of the same dose. It causes vaso-constriction of the coronary arteries. On the pupil it acts by diminishing the tonus of the sympathetic supplying the iris and causes a myosis. It acts as an antagonist in the glycosuria produced by adrenalin in rabbits. In all respects lymphogangline is antagonistic to adrenalin. The writer finds also that the antagonistic actions of adrenalin and of lymphogangline on the pupil, heart, and blood vessels, and on glycosuria are paralleled by those of adrenalin and of the lymph of the efferent lymphatic vessels and of the thoracic duct. He concludes that lymphogangline belongs to that type of hormones which inhibit functions, that is, hormones which economize energy. Swale Vincent in *Endocrinology* (Vol. 2, No. 4), under the title the Newest Hormone, makes a sweeping criticism of Marfori's claims and reduces it to a "useless and dangerous" active principle. [Leonard J. Kidd (London, England).]

**Ghedini, G.** RATIONAL ORGANOOTHERAPY. [Gazz. d. Ospedali, Jan. 5, 1919.]

This author's excellent work on the gonads, the pancreas, and the thyroid, makes his suggestion that instead of using the extracts of organs the venous blood issuing from the organ should be used an especially interesting one. The true internal secretion is to be found only in the blood. The removal of the organ, therefore, from the body arrests production of the hormones but modifies it. The blood coming from the gland, however, contains the maximum vital secretion.

**Friedman, G. A.** EXPERIMENTAL PRODUCTION OF LESIONS, EROSIONS, AND ACUTE ULCERS BY REPEATED INJECTIONS OF PILOCARPINE AND ADRENALIN. [Journal of Medical Research, July, 1918.]

Rabbits injected with pilocarpine developed lesions, erosions or acute ulcers in the mucosa of the stomach. When the rabbits were in-

jected with pilocarpine and adrenalin, lesions were seen in the mucosa of the stomach and duodenum. These injections of pilocarpine in rabbits produced various degrees of spastic contraction of the stomach, resembling the hypertonic stomach in man. In summarizing his results, Friedman states that the production of gastric and duodenal ulcer will depend upon the synergic work of vagotrope and sympathicotrope hormones, as in the rabbits after repeated pilocarpine and adrenalin injections. A discussion of his experiments leads him to suggest a fruitful topic for consideration—whether the function of the adrenals is really disturbed in Graves's disease.

**Massalongo, R.** SUPRARENAL-PITUITARY TREATMENT OF ASTHMA.  
[Rivista Critica di Clinica Medica, Oct. 5, 1918.]

Asthma is here regarded as a pathological perversion of the act of respiration. Massalongo regards the centrifugal factor as of importance while most clinicians incriminate the centripetal influence. He considers the latter as merely the occasional cause. Although it is advantageous to get rid of this factor, the primal factor is the inherited or acquired "asthmogenic state of the medulla oblongata" which is a neurosis of the bulb and specifically of its respiratory center. A close analogy appears between asthma and epilepsy. In his clinical experience asthmatics have regularly been neurotics. The source of the peripheral or internal centripetal irritation inciting the paroxysm should be discovered, but the morbid sensitiveness of the asthmogenic center should be mainly attacked. Combined epinephrin and pituitary treatment should be chiefly relied on, not omitting, however, the toning up of the system as for neurasthenia. Marvelous results, impossible to realize with either alone, have been gained according to Massalongo, by this treatment. He calls it an infallible method, fully determined by his eight years experience. He found his most efficacious dose to be 0.0008 gm. of epinephrin (adrenalin) and 0.0004 gm. of pituitary extract (puititrin), in solution in 1 c.c. injected subcutaneously. Even as little as 0.0002 gm. sometimes proved effectual. Vasomotor paresis in the medulla oblongata is suggested as the cause of the attack of asthma, because these substances at once overcome such a tendency. Their immediate efficacy further confirms the hypothesis that the medulla is mainly responsible for the asthma.

**Laignel-Lavastine.** DISAPPEARANCE OF THE LIPO-CHOLESTERINE OF THE HUMAN ADRENAL IN MOTOR AGITATION. [Compt. Rend. Soc. de Biol., 1918. LXXXI, p. 324.]

The writer has found that when there has been great and prolonged motor agitation in cases of senile dementia, dementia præcox, and maniacal or confusional excitement, necropsy reveals a complete absence of the lipo-cholesterins of the adrenal cortex: the whole of the spongy

zone has gone, and no spongiocytes are found in either the glomerular or the fasciculated layer of the cortex. A similar condition is sometimes found apart from motor agitation. Accepting Mulon's teaching that these cortical enclosures are reserves of accumulated lipoids, the writer concludes that intense prolonged motor agitation leads to exhaustion of the labile phosphorated fats of the adrenals.

**Boyd, W.** A CASE OF ACUTE SUPRARENAL INSUFFICIENCY. [Jour. Lab. and Clin. Med., Dec., 1918, 4, No. 3, p. 133.]

The patient, 38 years of age, a soldier in a military training camp, was found one morning in a semiconscious condition. Admitted to the hospital a few hours later he was sinking into a state of coma. The picture suggested cerebral hemorrhage with limbs rigid, reflexes gone, pupils distinctly dilated, face and hands cyanosed, and a temperature of 99° F. Urine was normal. Cerebrospinal fluid showed no change and gave a negative Wassermann reaction. The patient died two and a half hours after admission.

The necropsy, performed within two hours of death, showed the suprarenals to be the only organs exhibiting any marked pathologic change, being almost entirely destroyed, and converted into structureless, amorphous, yellowish masses, firm in texture, and considerably larger than the original glands. On the right no trace of suprarenal tissue, either cortex or medulla, was found. On the left a narrow strip of gland of about 2 mm. in width was present, consisting entirely of cortex, whose cells contained a lipoid substance staining red with Scharlach R, but not anisotropic. The rest of the gland consisted of areas of necrosis surrounded by the endothelial and giant cells characteristic of tuberculosis. There was no trace of medullary substance. A small nodule showing the microscopic structure of a sympathetic ganglion was attached to the caseous mass. The nerve cells and fibers of this ganglion were stained by various methods, while they showed no abnormality, showed some increase of fibrous tissue.

**Löwenthal, K.** SUPRARENAL APOPLEXY. [Berl. med. Woch., Nov. 25, 1918.]

A patient with double pneumonia and pleural collection developed intense abdominal pain, constipation and slight meteorism, profuse sweating, and a slow, irregular pulse. At autopsy there was found a hemorrhage in both adrenals; the medullary substance was entirely destroyed in one, and greatly involved in the other. The cortex of the glands was preserved. The writer points out the concordance between the clinical signs offered and the physiological data known, which show that the disturbances arising in this case resulted from a lack of tonus of the sympathetic, that is to say, from an adrenalin insufficiency. The differential diagnosis from ileus or peritonitis should be based above

all on the pulse, which in these circumstances is rapid, while in supra-renal apoplexy there is a tendency to slowing of the pulse rate. In the case reported by the writer there were 44 beats to the minute.

## II. SENSORI-MOTOR NEUROLOGY

### 1. PERIPHERAL NERVES.

**Tarchetti, C.** PERIPHERAL NEURITIS IN CHRONIC ACONITE POISONING. [Gazz. deg. Osped., Aug. 8, 1918.]

Ten cases of peripheral neuritis in men with pulmonary tuberculosis were observed by the author as occurring at a certain hospital. He was able to trace it to a prescription in vogue which contained aconite. The neuritis was due to chronic aconite poisoning, as there have been no further cases of the neuritis during the six years since the aconite prescription was discarded.

**Sicard and Roger.** LOSS OF ACHILLES REFLEXES IN INTENSIVE ARSENICAL TREATMENT. [Paris médical, June 29, 1918.]

The authors call attention to destruction of the Achilles tendon reflexes as an early sign of chronic arsenical poisoning in paretics subjected to intensive neoarsenobenzol treatment in the daily intravenous dose of 0.3 gram, up to an aggregate dose of twelve to twenty grams. The loss of the reflex indicates a latent arsenical neuritis of the internal popliteal nerve, as yet unaccompanied by disturbances of locomotion, pain or muscular atrophy, yet already resulting in certain quantitative modifications of the electric reactions in the involved muscles. Paretics subjected to such treatment show marked physical and mental improvement, but there is no clinical or humoral cure, the Bordet-Wassermann reaction in the cerebrospinal fluid remaining irreducible.

**Preisner, S. A., and Davenport, C. B.** MULTIPLE NEUROFIBROMATOSIS (VON RECKLINGHAUSEN'S DISEASE) AND ITS INHERITANCE. [American Journal of the Medical Sciences, Oct., 1918.]

These authors describe the occurrence of von Recklinghausen's disease in a father and son, with the autopsy findings in the case of the father, in whom the disease lasted thirteen years. The presence of the disease in the son was associated with definite mental inferiority and delayed sexual development. The writers give a review and analysis of 243 cases of multiple neurofibromatosis from the literature, and an analysis of thirty cases of the familiar type, with charts of families in which there were two or more affected persons in one family. This establishes the hereditary tendency of the disease, showing the hereditary factor to be dominant, there being something, apparently, in the germ plasm that positively facilitates the production, under appropriate stimulation, of tumors of the nerve sheaths. The tumors at times assume a malignant character.

Cumston, E. G. GENERALIZED NEUROFIBROMATOSIS. [N. Y. Med. J], Oct., 1918.]

Generalized neurofibromatosis is characterized by the following symptomatic triad: cutaneous and nerve tumors and pigmentation of the skin. To these, various functional disturbances should be added, such as those of the intelligence, paresis of movement, epileptiform paroxysms, indefinite anesthetics, and severe cramps.

The cutaneous neofibrations are composed either of grains of molluscum or of neoplastic masses which may assume enormous dimensions.

The tumors of the nerves develop on the subcutaneous branches and in series along the nerve. By inspection they cannot be detected, but they are easily felt on palpation. The cutaneous pigmentation forms spots varying both in size and color, from "café au lait" to a reddish brown. In size they vary from that of a lentil to extensive patches, while their distribution over the cutaneous surface is most capricious. Piloous nevi may develop. In some few cases the pigment patches have been known to develop in the mucosa, thus making a differential diagnosis from Addison's disease a rather difficult matter.

The disease is now considered to be hereditary and not infrequently familial, and a neurofibromatosis occurring fairly late in life must be looked upon as a congenital affection. As to the familial character of the disease, it has been proved by a number of examples, the most curious of which is unquestionably the case recorded some years since by Czerny.

The prognosis is essentially variable according to the form assumed by the disease in a given case and is generally in direct relation to the number of new growths present. When the tumors involve the central nervous system the outlook is, of course, unfavorable. The prognosis should always be reserved because, although frequently individuals presenting the affection from birth may attain the age of fifty years or more, it must not be forgotten that very frequently also the affection takes on a much more rapid evolution. The extremely accentuated marasmus in which these subjects die must also be taken into account. Finally, the new growths may, at a given time, take on a considerable development and cause functional disturbances from size alone, and further, in spite of their apparent benignity the tumors have been known to undergo a malignant evolution in the form of a sarcomatous transformation.

The pathogenesis of neurofibromatosis is rather obscure, and all that can be said is that it is a disease involving the ectodermic elements, since the skin and nervous system are the only structures involved.

The primary malformation of the ectodermic cells and their secondary lesions result in the development of the symptomatology of the affection. In the nervous system, the lesions of its elements result in various



functional disturbances, while in the epidermis the lesion of its elements is the origin of pigment spots. Finally, the elements uniting the skin with the central nervous system, which are likewise derived from the ectoderm, are in a condition of inferiority because they are malformed and also because they imperfectly conduct the impressions. The result is the development of teratomata on the nerve trunks and this represents the first phenomenon of a process of proliferation. At a later date this proliferation may increase in intensity, and, although retaining its primary structural nature, it can give rise to enormous fibromata, or, returning to the embryonal state, produce sarcomatous growths with all the malignancy characteristic of this neoplasm.

**Mayer, E. E.** RADICULITIS. [J. A. M. A., Aug. 3, 1918.]

Radiculitis is defined as an acute inflammation of the spinal nerve roots both anterior and posterior. He does not believe in excluding from this class neuralgic conditions of the spinal roots, which has been advised by Wertheim-Salomonsen, and the term when used should include both a neuralgia and a neuritis of the spinal roots. Radiculitis is more frequent in the lumbosacral than in the cervical or thoracic roots, because here the roots are longer and more perpendicular and having fewer anastomoses, their involvement is more easily distinguished from neuritis of the nerve trunks. In the cervical region, sensory and also motor root symptoms invariably involve several adjacent roots, and the motor root symptoms overshadow those of the sensory roots. A radiculitis of the cervical region frequently has a superficial resemblance to an Aran-Duchenne syndrome, and a lumbosacral radiculitis is generally thought to be sciatic neuralgia. Many kinds of infection may cause the disorder, but radiculitis is usually syphilitic in origin, occasionally tuberculous. The various mechanical origins are not dealt with in this paper. The region involved begins where the roots pierce the dura mater and ends at the place where the posterior root fibers reach the superior pole of the ganglion. Mayer points out the anatomic conditions which exist, and the fact that the cerebrospinal fluid bathes the surface of the nerve so that accumulations of endotoxins may occur and bring on a perineuritis. The onset of the neuralgia is generally so sharp and painful that other diagnosis than neuralgia or neuritis is seldom made and may prevent the physician from recognizing that he is not dealing with disease of the nervous system at all. At first the local pain of neuralgia may be unaccompanied by any objective loss of sensation, but the usual later finding is a progressive decrease of tactile sensation, not altering in extent except when other nerves become affected. The true type of radicular sensory disturbance is the bandlike areas invaded, around the trunk in zones, or in striæ parallel to the long axis of the limbs in the arms and legs. This is explained by the embryonic development in a series of metameres. The segments corresponding to

these metameres in the central nervous system are called neurometers. If we refer to sensory innervation we speak of dermatomes; of muscular innervation myotomes. These two are dissimilar, since the sensory root area of the skin does not correspond to the same motor root zone. In radiculitis, the affected sensory areas are usually only hypesthetic, and anesthesia only follows complete destruction of the root, and, as a rule, then only when two or more roots are involved. A radicular type of anesthesia occurs at the height of a cord lesion, but with hyperesthesia above it, and below it, a sensory dissociation of a syringomyelic or Brown-Séquard type of paralysis. This, of course, refers only to unilateral and partial lesions. Total myelitic lesion symptoms never leave one in doubt. These types of dissociation do not occur in radiculitis. Overlapping of innervation is generally accepted and skin areas of the trunk, undoubtedly, are always innervated by several roots. The acts of coughing, sneezing and straining at stool cause severe pains along the limbs. This is not diagnostic, however, though apparently considered important in Dejerine's description. The importance of other symptoms, such as the serologic findings and the Wassermann reaction, the unilaterality, the possible muscular atrophy and spasms, are noticed. The article is generally a fairly full description of the disease. Four illustrative cases are reported.

**Krumholz, Sigmund.** LUMBOSACRAL ROOT LESIONS. [J. A. M. A., Sept. 14, 1918.]

The author reports the case of a laborer, without hereditary, alcoholic or syphilitic taint, so far as known, who fell off a ladder at a height of ten or twelve rounds, and has since suffered from continuous pain in the left hip, with later intense neurologic attacks over the left iliac region, accompanied by numbness of the leg, most pronounced on its external surface. The accident had occurred about sixteen months before he came under the author's observation. It had confined him to his bed for three months, with treatment for fracture of the hip. After another five months he was again taken to the hospital, operated on for hernia, and confined to bed for about six weeks. Since then he had suffered from a continuous dull, nagging pain in the leg, with neuralgic paroxysms, and has been laid off at times for a couple of weeks. In walking he favored the left limb, and could not lie on his back more than a minute without suffering pain on the left side of the pelvis. The reflexes were apparently normal and there was no marked atrophy of the leg, no more than would have followed its partial disuse. The lateral surface of the left leg was completely anesthetic, and the only part in which sensations were normal was around the anal region, scrotum and root of the penis. The diagnosis of the case presents some difficulties, and the nervous anatomy of the regions involved is gone over by Krumholz. The predominant feature of the case was sensory disturbance, and the

author locates the injury causing the symptoms in the intradural posterior roots of the lumbar and sacral region, excepting, at least partially, the lower sacral roots. The diagnosis could not be confirmed by exploration of the plexus and was, therefore, more or less hypothetic, as the patient refused any further operation. The article is a good discussion of the subject, however, of posterior root lesions in the said region.

**Schaller, W.** CERE BROSPINAL FLUID FINDINGS IN HERPES ZOSTER. [California State Journal of Medicine, San Francisco, Oct., 1918, 16, No. 10.]

A lumbar puncture was performed in 21 cases of 79 cases of herpes by Schaller. In 14 cases in which a blood Wassermann alone was done 4 cases showed a positive reaction and 10 a negative reaction. The remaining 44 cases were not examined by the blood or fluid tests, nor were they clinically cases of syphilis. Nine occurred in syphilitic persons and in all but 1 of these the fluid showed a characteristic reaction of syphilis of the central nervous system. Eleven cases were negative for syphilis. However, in 5 out of these 11 cases there was a cellular increase above the normal. The globulin test in these 5 cases was negative or slightly increased. Schaller concludes that herpes zoster occurs with comparative frequency as symptomatic herpes in syphilis of the central nervous system. In nonsyphilitic herpes an increased cell count may mislead the clinician if other evidence suspicious for syphilis is brought out in the general survey of the case.

### 3. SPINAL CORD.

**Regan, J. G.** SKIN AND FAUCIAL MANIFESTATIONS IN ACUTE POLIOMYELITIS. [Arch. Ped., Dec., 1917.]

As the onset and systematic stage of acute poliomyelitis may suggest the diagnosis of one of the exanthemata, such as scarlet fever or measles, attention should be paid to the tongue, mouth, throat, and skin manifestations, about which comparatively little has appeared in the recent literature on the disease. Regan's conclusions are based on observations of over 800 cases during the acute stage. The pharyngeal and faucial mucous membrane is almost constantly congested in the early stages, the soft palate being diffusely dark red in color, while the hard palate is unchanged. Anemia of the throat in the acute stage is very rare, and is almost confined to bulbar cases with a hopeless prognosis. The punctiform rash common on the soft palate in scarlet fever is not present in acute poliomyelitis, and the throat of measles and of diphtheria after the membrane has disappeared is much more like that of poliomyelitis than is the throat of scarlet fever. Mild inflammation with some enlargement of the tonsils is very common, but follicular exuda-

tion and true membrane do not occur. In five cases the oral mucous membrane showed appearances like Koplik's spots. In bulbar cases there may be conjunctivitis. In the early stages the tongue almost always shows a moist grayish or yellowish-white coating, the tip and edges being free and redder than normal; after removal of the fur the papillæ are not prominent as in scarlet fever. The coating is often "geographical" in its distribution. The lingual appearances in acute poliomyelitis and cerebrospinal fever are much alike as regards the thick yellowish-white covering over the anterior and middle parts of the dorsum. Gingivitis occurs in 10 per cent. of the cases, and is not so common or so well marked as in measles. Rashes are so frequent that they should be regarded as among the possible signs rather than as accidents, and among 1,017 cases were noted in 114, or 10 per cent. The same patient may have two rashes, one during the first or second week and the other during convalescence; 80 per cent. of the rashes occur in children under 3 years of age, and over 80 per cent. were observed during the first week. The mortality appeared to be lower in the cases with rashes than in those without. The average duration of the rashes, which may appear as early as the second day or as late as the sixth week, is about four days. In 90 per cent. the neck and chest were the site of the rash, and the extremities, especially the lower, were the parts least often affected; this duration is obviously of value in the diagnosis of a scarlatiniform eruption from true scarlet fever. Bulbar cases rarely had an eruption, whereas meningitic cases very frequently presented this sign. The commonest rash is a pin-head papular eruption, which is generally preceded by a scarlatiniform eruption lasting from twelve to twenty-four hours. When occurring during convalescence a scarlatiniform rash, especially if the throat remains congested, is often difficult to diagnose from true scarlet fever, but the other symptoms are negative, and desquamation does not occur on the palms and soles. Many of these rashes are ascribed to intestinal toxemia or to sweating, and the pin-head papular rash closely resembles, if it is not identical with, malaria papulosa. Though herpes does not occur, large blebs may form on the skin. Desquamation, though rarely described in connection with poliomyelitis, may be very frequent and profuse, usually furfuraceous and resembling that of measles, but sometimes suggesting scarlet fever! its distribution corresponds to that of the rash.

Regan's observations may be summed as follows:

1. Congestion of the throat is an almost constant symptom during the early stage (acute) of the disease. It is as a rule limited to the faucial mucosa and the pharynx, while the soft palate assumes a deep red color and often also a deep violaceous tinge, but the surface blood vessels of its mucosa are not usually congested to any very noticeable extent. This violaceous tinge varies in degree and while not by any means typical, is somewhat distinctive of poliomyelitis when it is marked. The capil-

lary congestion of the mucous membrane of the throat in scarlatina is more intense and involves a much more extensive area. In addition to this there is a punctiform rash on the soft palate and the throat is a bright red color.

2. A mild degree of inflammation of the tonsils is very common in poliomyelitis, but follicular exudation is very rare and true membrane formation has never been encountered.

3. The uvula has often appeared unusually small for the ages of the patients.

4. The buccal mucosa varies only slightly in color during the acute stage. Koplik's spots may be closely simulated.

5. The tongue is heavily coated with a grayish or yellowish-white coating, the edges and the tip being devoid of covering. The tongue of poliomyelitis differs definitely in its characteristics from that of scarlet fever.

6. Gingivitis occurs in a small proportion of the patients.

**Smillie.** CULTIVATION EXPERIMENTS ON THE GLOBOID BODIES OF POLIOMYELITIS. [Jour. Exp. Med., 1918, 27, p. 319.]

Owing to the technical difficulties offered in the identification of the globoid bodies isolated from cases of poliomyelitis by Lafora and Hough, Flexner and Noguchi, many investigators have been unable to confirm their results. Smillie, fully cognizant of the problems involved, has undertaken a simpler and more successful method. Poliomyelitis was produced in rhesus or cynomolgus monkeys by virus inoculated intracranially, intranasally, or hematogenously. After the disease had reached its height the animals were etherized and small sterile pieces of cerebrum, cord, liver, spleen, kidney or thymus were put into sterile test-tubes into which a sterile piece of rabbit kidney had been placed. About 15 c.c. of sterile, clear, bic-free, relatively fresh, warm, ascitic fluid of no less than 1.015 specific gravity were then added. Complete anaërobiosis was obtained by the hydrogen-nitrogen jar. As many as twenty-five tubes were placed in each jar and incubated for eleven or twelve days. The second generation was made by taking 0.2 c.c. of fluid from the first and subculturing it in other ascitic-kidney media. In addition 0.1 c.c. was planted in tubes containing a semisolid medium. At least five subsequent generations were made. In all eighteen monkeys were used. In the first 4 vacuum jars were used and the results were unsatisfactory. The material from 3 other monkeys showed streptococci, which the author regarded as agonal invaders. Of the remaining 11, typical globoid bodies were obtained from 7, with a total of twenty-two strains. The largest number of strains per monkey was six; 2 gave only one strain. Nineteen of the completely isolated strains were obtained from the brain, one from the cervical cord and two from the spleen. Eleven completely isolated cultures were encountered. No positive diagnosis

was made unless the globoid bodies were found under at least five different fields. Twenty-eight days was the shortest period of time, after the primary inoculation of the media, which was required for a positive diagnosis, while the longest time was fifty-four days. No definitely positive culture was ever found in the first generation. It was found in another series of experiments that the globoid bodies were unable to attack even the simple sugars. Eight different strains which had been isolated by the author were inoculated into healthy monkeys. Three of the animals exhibited some degree of paralysis after intracranial and intraspinal injection. None of the cultivated strains produced typical poliomyelitis. The author concluded from this that very few cultures retain sufficient pathogenicity to cause poliomyelitic infection in monkeys.

**Williamson, R. T.** SOMATIC AND PSYCHOGENIC CORD DIFFERENTIATION. [B. M. J., Sept. 14, 1918.]

The author concludes in this interesting study, as follows: Certain reflexes are of the greatest service in the differential diagnosis and early recognition of organic disease, and especially valuable in early cases are the Babinski or Oppenheim reflex, and in many cases the loss of the tendo Achilles reflex, since these signs may be detected when other definite changes have not yet occurred.

The chief difficulty occurs when the knee-jerks are not lost, and when ankle clonus, rectus clonus, and clasp knife rigidity are not obtained. In one group of cases the Babinski or Oppenheim reflex is obtained, and this is diagnostic of organic disease. In other cases the plantar reflex is not of the Babinski type, and it may be lost or feeble. In these the loss of the tendo Achilles reflex would be diagnostic of organic disease.

The following are combinations of diagnostic importance, especially at the onset of a number of organic affections.

Paresis with loss of the tendo Achilles reflex, as in early anterior poliomyelitis—chronic, subacute or acute.

Paresis with loss of the plantar reflex and loss of the tendo Achilles reflex (in many organic diseases).

Paresis with double sciatica and loss of the tendo Achilles reflexes, as in early cauda equina lesions.

Paresis with loss of the tendo Achilles reflex, loss of the vibrating sensation, and pains in the legs, as in early peripheral neuritis.

Loss of the vibrating sensation with very slight incoördination and very slight paresis, with or without a Babinski reflex, as in early combined postero-lateral degeneration of the cord.

Paresis, with Babinski reflex (in many organic affections).

Paresis with loss of the vibrating sensation and Babinski reflex (in the early stages of several organic diseases of the cord).



Root pains, or root symptoms, followed after a period of weeks or months by paresis, as in meningeal spinal tumor.

(In all these early combinations the knee-jerks may be obtained.)

When the diagnosis has been especially difficult, or the symptoms slight and indefinite, the three indications of organic disease which I have found of the greatest service in my own practice have been the Babinski or Oppenheim reflex, the loss of the tendo Achilles reflex, and the loss of the vibrating sensation, whilst other forms of sensation are unaffected.

The value of the Babinski reflex is well known, but the cases briefly mentioned and the points emphasized in this article are, I think, sufficient to indicate that in addition to the well known signs in favor of organic affections we have in the loss of the tendo Achilles reflex, or of the vibrating sensation (whilst other forms of sensation are unaffected), two further signs of much service, and deserving of more frequent consideration in the differential diagnosis and early recognition of certain forms of organic nervous disease.

In certain specially difficult cases, when other usual and well known signs are indefinite or cannot be detected, these two signs are often of great diagnostic value.

**Porot, A.** ORGANIC PARAPLEGIA DUE TO LIGHTNING STROKE. [Rev. Neur., 24, 1917, 13.]

Paralyses are not rare in persons who have survived being struck by lightning. They are, however, commonly functional paralyses, and have a good prognosis. Porot recently described three cases in which the physical signs pointed to organic rather than functional paraplegia due to lightning stroke. The patients were Serbian soldiers. In August, 1916, on the Macedonian front, a number of these men were reposing under a tree during a thunderstorm, in spite of the general belief that it is unwise to take cover under trees during thunderstorms, when the lightning struck and killed four of them. Others were struck and survived, and two of these were under the author's charge six and eight months after the accident. One had very extensive scars of burns on the right chest, iliac fossa, thigh and knee. He was unable to stand or walk, exhibiting intense spasmodic paraplegia, with much wasting of the muscles, particularly in the left thigh and right leg. The left quadriceps extensor showed clonic spasms while at rest; there was patellar clonus and an extensor plantar reflex on the right side, while no plantar reflex could be obtained on the left. On both sides the abdominal and cremasteric reflexes were increased. Both legs were insensitive to touch, pain and heat up to a level some two inches above the patella, and there was similar hypo-esthesia of the trunk and arms up to the base of the neck. The sphincters were not involved.

The second patient was less badly burned, and, by May, 1917, had

to a great extent recovered. He still exhibited, however, permanent diminution of sensation (touch, pain and heat) in various areas of the left leg, especially those supplied by the second lumbar and first and second sacral segments, with loss of sensibility to heat in the same areas on the right. The third patient, who was not under Dr. Porot's charge, had not lost his senses when he was struck (as the other two had), but was suddenly seized with paralysis while marching next day. By June, 1917, he had greatly improved, but showed much increased reflexes, ankle clonus on both sides, patellar clonus, and a feeble extensor reflex on the left.

**Bing, R.** A NEW REFLEX SIGN IN SPASTIC PARAPLEGIA. [Correspondenzblatt für Schweizer Aerzte, April 13.]

The author here notes the sign which he proposes to call the paradoxical ankle reflex. He observed it first in a case of syphilitic hemiplegia, and has since established its constant occurrence in organic spastic conditions involving one or both lower extremities. It is easy to elicit and of unequivocal significance. With the patient of his back the affected leg is put into the usual position for testing ankle clonus, being moderately flexed at hip and knee. The examiner's hand brings the foot into moderate dorsiflexion, with consequent slight tension on the Achilles tendon, while a sufficiently heavy percussion hammer is employed to strike the dorsum of the foot at any point along the imaginary line joining the malleoli. In positive cases there results an immediate contraction of the gastrocnemius and a corresponding flexion of the foot at least as marked as is usually obtained for the ordinary ankle—or Achilles—jerk. It is immaterial whether any particular tendon of the extensor group, including the tibialis anticus, extensor proprius hallucis and communis digitorum, is struck or not. In negative cases no movement results, or else simply a weak extension or dorsiflexion. The reflex obviously bears a close resemblance to the familiar Mendel-Bechterew reflex—the tarso-phalangeal reflex—and to the carpo-metacarpal reflex of Bechterew in the case of the upper extremity. In other words, it belongs to the group of what may be called inverted reflexes, where percussion on the extensor side of a limb is followed by contraction of the flexors, or *vice versa*. Dr. Bing mentioned also the paradoxical and inverted reflex described by Piotrovski, percussion of the belly of the tibialis anticus producing a smart plantar-flexion of the foot; he is in doubt, however, as to the inclusion of the "Gordon" reflex in this category. He has found this new reflex present in four cases where the other more commonly elicited reflex signs of organic spasticity from corticospinal impairment were apparently absent, and justifiably claims it to be worth further investigation.

**Hughes, D. M.** LAMINECTOMY FOR GUNSHOT WOUND; WITH A RECORD OF THREE SUCCESSFUL CASES. [Brit. M. J., 1918, I, 280.]

Gunshot wounds of the spine are now being reported in great profusion. The vivisection methods of war are ruthless and offer kaleidoscopic mosaics of every conceivable pattern. A schematic division is here made of complete and incomplete lesions. A complete lesion is evidenced by flaccid paralysis with loss of reflexes and sphincter control, and denotes that a complete interruption of the impulses in the tracts of the cord has occurred. In incomplete injuries the missile hits the spinal column, but the theca is not hit by the missile or the displaced bone, and the resulting paraplegia may be: (1) quite transitory and flaccid but apparently complete; (2) may only appear after an interval; or (3) may or may not have a transitory period of flaccidity with completeness merging more or less rapidly into a spastic condition of any degree. These three conditions may be caused by: (1) concussion; (2) intraspinal, subdural or intramedullary effusion; (3) granulation tissue about a sinus or retained missile; or (4) callus.

The indications for operation as given by Makins from experiences in the South African campaign are: (1) excessive pain in the area above the paralyzed segment, for relief of immediate suffering, (2) a recovering lesion which seems due to fragments of bone or missile encroaching upon the spinal cord.

As to prognosis, there will not only be spontaneous recovery in concussion which produces a shock resulting in cessation of function of the whole cord, but a large number of spastic paraplegias also improve or recover with rest. The gravest sign is flaccid paralysis which entails complete loss of function of the sphincter, motor, and sensory tracts below the lesion. If transitory, the prognosis will be good; if persistent, it will be bad. The slow progress of caries paraplegia gives good opportunity for prolonged observation, and a definite involvement of the nerve tracts is seen; disturbance in motion occurs first, then very soon sensation; but a considerable degree of impaired sensation may exist with but slight loss of motion. Sensations however are usually lost before the sphincters are affected. In recovery sphincter activity returned first, then sensation, and lastly motion.

In five of the author's cases the missile was in the spinal canal and all were complete cases. In three the missile was removed with no improvement of the patient. In four there was flaccid paralysis and laminectomy was done for girdle pains or to remove foreign bodies; no improvement resulted and one died. Three had spastic paraplegia of different degrees and all made recovery.

**Couteaud.** SPINAL INJURIES OF WAR. [Bull. et mém. Soc. de chir. de Par., 1918, XLIV, 728.]

The author here reports his observations on 42 spinal war injuries. In 12 of these there was section of the cord and all of these were rapidly

fatal. The general mortality was 47.6 per cent. The diagnosis of a projectile in the spinal column, although facilitated by the X-rays, needs a skilled clinician. About two thirds of the cases show effusion of blood in the spinal cavity. But although this may be the case, spinal puncture may be negative. If section of the cord is incurable, hemisection is not necessarily fatal. Many fractures cure by rest. When there is an intravertebral projectile, especially in the canal, it calls for prompt operation. An early laminectomy is best for the patient and easiest for the surgeon. Risks of infection and compression of the cord are least for the patient and the bone is more manageable. It is perhaps difficult to overcome hemorrhage, and the copious use of adrenalin in the canal is indicated. After exposure of the cord the use of a general anesthetic may be dispensed with and medullary discontinuous anesthesia adopted without risk.

**Abrahamson, I.** ORGANIC NERVOUS MANIFESTATIONS IN THE COURSE OF DISEASES OF THE BLOOD AND BLOOD FORMING ORGANS. [N. Y. Acad. Med., May 21, 1918. Med. Rec., Aug. 31, 1918.]

Dr. I. Abrahamson presented this paper, in which he said that the structural changes in the nervous system which accompanied severe anemia, pernicious anemia, leucemia and chloroma, Hodgkin's disease, grave malaria, pellagra, polycythemia vera, Addison's disease, general carcinosis, tuberculosis, diabetes, lues, lead and ergot poisoning, all resembled one another so strikingly that one could distinguish a definite group picture characteristic of the nervous system in these blood conditions. The structural changes which most frequently occurred in this group were multiple hemorrhages and myelitic foci surrounded with infiltrated areas. Thus a diffuse myelitis, mainly in the dorsal region, was produced which was accompanied by a secondary degeneration, affecting the posterior columns, pyramidal tracts, Clarke's columns, Flechsig's and Gower's tracts. This morbid change was commonly called subacute combined sclerosis. The essayist, after reviewing the various theories which have been advanced regarding the way in which the disease was spread, stated that Nonne's theory was the one most widely accepted to-day. Nonne ascribed all the changes to a funicular myelitis and pointed to the significant fact that the disease of the roots rarely extended beyond the cord proper and that only the intra-spinal portions of the roots were implicated. The degree of anemia seldom corresponded with the degree of nerve destruction. The nerve changes might not merely persist, they might increase in severity concomitantly with the amelioration of the anemia. Experimentally induced anemias such as that following the injection of lycopodium powder were not, as a rule, accompanied by any nerve lesions. In uncomplicated chronic anemias the occurrence of structural changes in the nervous system was so rare as to be doubtful. The exciting cause of the structural change in the

nervous system in blood disease was therefore not the anemia *per se*, but an accompanying toxemia. In the anemia accompanying the *Bothriocephalus latus* infection the nerve changes were of frequent occurrence and the toxin which produced them had actually been isolated. The toxin produced relatively slight anemia but relatively grave nervous changes. In discussing the symptomatology, the essayist said there was no distinct parallelism between the extent of the nerve lesions and the severity of the symptoms that arose from them. With slight lesions grave symptoms might exist; with few symptoms the nerve tissues might be invaded to a surprising extent. This seeming anomaly depended in part on the rate of development of the lesions, partly upon the compensatory activity of the unimpaired portions of the nervous system, and partly upon the psychic reaction to the structural alterations. A similar discrepancy between symptoms and lesions might also be often seen in tabes and in multiple sclerosis. The extent to which the nervous system was implicated depended upon the stage of the disease; at the onset the localized irritability alone might exist; later the invasion spread and the manifestations of the disease become more pronounced, until finally widespread paralysis might result. The nature of the manifestations varied with the essential site. The signs of motor column degeneration were chiefly atony, loss of tendon reflexes, and ataxia, and loss of the deep muscle reflexes. The signs of pyramidal tract involvement were motor weakness, hypertonia, and exaggerated deep reflexes. These signs might be found in all possible combinations, depending upon the degree to which each of these columnar systems was respectively implicated. In addition, pains and paresthesias and objective sensory disturbances were usually present. Rarely optic atrophy occurred and still more rarely pupillary disturbance. Under the title, subacute ataxic paraplegia, Risien, Russell, Batten, and Collier gave a very comprehensive study of this syndrome. The disease lasted from six to eighteen months. It could be differentiated into three stages: (1) That of paresthesia, pain, mild spasticity, and ataxia. (2) That of definite spastic paraplegia with objective sensory disturbances in the trunk and legs. (3) That of flaccid paraplegia, loss of tendon reflexes, complete level anesthesia, loss of sphincter control, general and local muscular wasting, electrical changes in the muscles and nerves, girdle sensation, herpes zoster, disturbance of pain and temperature sense, edema, and trophic skin disorders. With these marked mental symptoms occurred confusion and disorientation, and apathy and coma. The prognosis in general was very unfavorable; the progress of the disease, however, might be slow and characterized by remissions. A few cases of apparent recovery were recorded. The disease thus described was that characteristically met with in the nervous system as an accompaniment to most blood affections. The writer also directed attention to a less well-known structural alteration of the nervous system which was sometimes seen in

Hodgkin's disease, in leucemia, and in chloroma. In these conditions foci of dense infiltration with lymphocysts might occur in the meninges, along the nerve roots in the cord itself, and in the vertebræ. Such cellular infiltrations superadded to the picture outlined gave the symptoms of a transverse myelitis, either of intraspinal origin or actually secondary to compression of the cord by meningeal or extraspinal accumulations. Hence a syndrome was produced which needed to be very carefully distinguished from Pott's disease and from tumors of the cord. From a large number of cases which the essayist had encountered he selected the following as specially illustrative of the disease of the nervous system which accompanied blood affections: (1) Severe secondary anemia with myelitis. (2) Pernicious anemia in a leucic with a clinical picture of tabes. (3) Hodgkin's disease presenting a tabetic picture with no evidence of lues. (4) Polycythemia vera showing affection of the nervous system.

**Kanavel, A. B.** OLD INJURIES OF THE SPINAL CORD. [Surgery, Gynecology and Obstetrics, June, 1918.]

Kanavel presents the history of a number of cases operated on for injuries of the spine which had been received some months or years previously, either fracture or gunshot wounds. His results show that all old cases of spinal injury should be carefully studied with view to possible operation. Little can be expected where paralysis and loss of sensation are nearly complete with incontinence of urine, if the lesion is above the cauda, particularly if it is over the dorsolumbar reflex-centers. Cervical fractures very frequently show hemorrhage within the cord and are very likely to prove fatal. The most favorable cases are those in which fracture has occurred below the lower dorsal reflex centers. He notes that pressure on the cord is usually above or below the site of injury because of the displacement of the injured vertebra and therefore at operation the spines and laminæ of the adjacent vertebræ should be removed. In one case of gunshot wound intolerable pain of six years' standing was completely relieved by the removal of a bullet not previously found. He also describes the removal of a bullet from a small boy, lodged between the base of the skull and the atlas inside the spinal canal, the removal being performed through the pharyngeal cavity. The boy made an immediate and permanent recovery.

**Frazier, C. H.** MILITARY ASPECTS OF SURGERY OF THE SPINE AND SPINAL CORD. [Surgery, Gynecology and Obstetrics, June 1918.]

Frazier calls attention to the variety and number of wounds of the spine and spinal cord in this war. Their nature depends upon the portion of the vertebra involved, the shape, velocity and direction of the projectile. Several arches may be involved either directly or indirectly and there may be considerable splintering and fissuring of the bone.



The bullet may become lodged in any of the bony parts of the column, or it may rebound and become lodged at some distance from the spine. Sometimes, owing to the momentum of the modern projectile, it passes through the entire spinal column while sometimes it sinks from its original position to a lower level of the canal. The cord may suffer laceration or complete severance by the bullet or indriven bone; it may be compressed by these or by a subdural hemorrhage, adhesions or serous exudates; it may be contused by the bullet and splinters of bone; or it may suffer severely from concussion or commotion. The effects of concussion may be due to the waves of pressure set up in the spinal canal and disturbance of the lymphatic circulation. The result is structural change even to the point of complete disintegration. Edema, hematomyelia, hematorachis, disseminated foci of necrosis, softening and cavity formation and parenchymatous changes, often over a number of segments, are among the lesions produced. Sometimes there is grave involvement of the cord caused by sudden changes in atmospheric pressure due to violent explosion.

Surgery of the cord demands careful and repeated neurological examination before resort to operation. There are four groups of cord lesions, the complete transverse lesion with total and absolute flaccid paralysis below the level of injury, with abolition of all reflexes and all forms of sensation; partial lesions, the spinal hemiplegia or the Brown-Séquard syndrome more or less typical; lesions or compression characterized by spastic paraplegia, exaggerated reflexes and positive Babinski; lesions of the cauda equina. Localization must depend upon motor as well as sensory disturbances. Account must also be taken of the lamellar arrangement of fibers, by which probably the longer descending fibers lie nearer the periphery of the cord. Careful tests must be made for various forms of disturbance of sensation. Important also are the indications of vegetative disturbances and other remote indications of local lesions. The X-ray has not proved sufficiently reliable yet is an indispensable aid to location and surgery, if too much dependence is not put upon it. An exploratory laminectomy is contraindicated in an indirect injury until time enough has elapsed without improvement to indicate that this is not a purely functional injury. It has been urged even when the decision could not even then be made that the relief and opportunity for diagnosis afforded by the operation justified the procedure. The damage may be accomplished at the time of the accident and the persistent symptoms be the result of intramedullary changes and not of continued compression. In either case an exploratory laminectomy is justified. Experience has proved that life may be saved and great improvement be obtained by operation in most severe injury. The need for absolute rest after this operation makes it best to delay procedure until the base hospital is reached. Later indications for operation are symptoms of pressure from an organized exudate, from callus, from a traumatic

pachymeningitis, from a circumscribed serous meningitis. Persistent and intractable pain is also a frequent indication.

Local anesthesia should be used whenever possible and the incision should be planned to include at least three vertebrae. The dura should never be opened unless there is clear indication that the bullet is within the dural sac. As a rule the dural incision should be closed to prevent infection; only in the rare instances when undue pressure would result from the swollen and edematous condition of the cord and in the absence of an infection from the wound should it be left unsutured. Catheterization is condemned because of the inevitable ascending infection. It has become customary in many war hospitals to allow the bladder to empty itself by overflow.

**Blanc y Fortacin, J.** SPINAL ANESTHESIA. [Rev. d. Med. y Cir. Prac., Mar. 7, 1918.]

Blanc reports his success with spinal anesthesia especially in leg operations. With some herniotomies he found a few whiffs of chloroform necessary. The injection takes effect in from three to ten minutes and lasts for about two hours. Contact sensation is not lost however. Sometimes there is slight headache which soon disappears, and often a febrile reaction with a turbidity apparent the next day in the spinal fluid with polynucleosis, showing aseptic irritation of the meninges, but normal conditions soon return. Vomiting and paresis were never present.

Only two of 200 cases resulted seriously. In one of these the assistant had used by mistake 0.12 gm. of novocain and syncope resulted, which was soon counteracted by artificial respirations. Conditions were most unfavorable in the other case, one for retrograde catheterization in an elderly man with impassable stenosis of the urethra. Cyanosis, coma and death followed the operation. There was one operation above the umbilicus upon an echinococcus cyst in the liver. This was successful. The anesthetic used as a rule consisted of 6 cg. each of stovain and glucoses and 1:1000 epinephrin in 1 c.c. of physiologic serum. Later it has consisted of cocain and epinephrin.

**Brickner, W.** SPINA BIFIDA OCCULTA. [Am. J. M. Sc., April, 1918, J. A. M. A.]

He believes that the following are legitimate indications for operation in cases of spina bifida occulta: 1. In infants and children, spina bifida occulta with congenital lipoma or hypertrichosis, even though without any symptoms—to reduce the spinal hernia into the canal or to meet any other indication that is found, in the hope of obviating the development of symptoms during adolescence. 2. In adults, spina bifida occulta with sufficiently serious and especially with progressive symptoms, whether or not the spina bifida occulta is marked by external

signs (lipoma, hypertrichosis). Progressive gangrene of the lower extremities and incontinence of the sphincters are indications sufficient to justify taking this risk. Brickner has found records of twelve operations. He adds five to these, all of the seventeen without mortality, and some with decided benefit. In all five operations for spina bifida occulta within Brickner's personal experience there was no untoward result, and the wounds in all cases healed per primam and without any spinal infection.

**Claude, H., Lhermitte, J.** SPINAL CONCUSSION. [Rev. de Med., Sept., 1917.]

Concussion of the spinal cervical region of the spinal cord in the cases described by the authors gave rise to quadriplegia, hemiplegia or monoplegia and a cerebellospasmodic set of symptoms without actual paralysis. Abortive cases of these various types are described. The evolution has been favorable in spite of the severity of the initial symptoms. Motor and sensory functions have gradually returned. Similar lesions in the dorsal, lumbar and sacral regions have in their experience given a more serious prognosis.

**Düring.** ANATOMICAL STUDY OF A CONGENITAL SPASTIC PARAPARESIS. [Schweiz. Arch. f. Neur. u. Psych., Vol. I, No. 1, 1917.]

There is great difficulty, Düring says, in separating the hereditary from the acquired factors in the production of spastic paralysis, since it does not become functionally manifest until the child begins to walk. So far there has been confusion between cause and effect in the etiology of the disease. The spirochete pallida with its predilection for the nervous system must probably also be taken into account. Though this cannot be accepted as the exclusive cause, still there should be a search for evidence of lues in every case. The occurrence in one family of many cases points to a common etiology. The literature contains references to or records of cases of syphilitic origin or of symptoms associated with syphilis. Spastic paralysis is a morbid process of a progressive character. The pathological agent does not become inactive but proves fatal in the second or third decade at the latest without an intercurrent disease.

The case upon which Düring bases his present studies he sums up as an idiot presenting a typical Little syndrome, but progressive, extending to the arms. Bulbar symptoms were wanting. The disease developed upon a hereditary basis. The patient developed epileptiform crises shortly before death and died at the age of 44. He draws certain conclusions from a detailed autopsy of the nervous system. The patient's brain in its general architecture seemed to have been originally well formed. There was no complete defect nor any heterotopia. But the central nervous system had been already altered during the fetal period by a diffuse pathological process. After birth the degeneration pro-

ceeded afresh and reached a chronic state showing alterations in vascularity and in nutrition. The weight of the brain was actually that of a microcephalic but the smallness of the convolutions is secondary and resembles that produced in general paresis. The general dimensions in the region of the protuberance and in the spinal cord and of the different tracts corresponded to those of an infant. The gray masses dependent directly upon the posterior regions of the central nervous system, like the optic thalamus and those of the protuberance, would necessarily have been those that suffered most in this case. Instead their relative integrity was proved. At the beginning of life some pathological factor had arrested development in the central nervous system. Some of the fiber bundles were almost completely lacking, others contained only a few myelinated fibers, others were well preserved. Centripetal as well as centrifugal fibers were affected, even when their nuclei were intact. The short association fibers were preserved. On the other hand neither all the projection fibers nor the longitudinal commissures were destroyed, so that the posterior cordons presented a good appearance and the paracentral portion of the corpus callosum was relatively well formed. The question arises whether the bundles were not yet myelinated or whether merely in the course of myelinization they had succumbed to toxic action more readily than portions where the myelinization was more advanced. The total dimensions in the region of the protuberance and of the spinal cord, where relative proportions were preserved, and in the fiber bundles, were those of an infant. It would appear from the appearance of the fibers in regard to their myelinization that possibly those unmyelinated or only partially so had more readily succumbed to toxic influence. Other changes discovered in the various localities of the central nervous system can be explained through a diffuse action of a pathological agent, probably at about the seventh month of fetal life.

There were striking modifications in the blood vessels, thickening of the veins, changes in the arterial walls, evidence of infiltration of lymphocytes, of a gliomatous reaction; also pathological evidence in the meninges, thickening, the pia mater and arachnoid in places grown fast to the nervous tissue, the presence of lymphocytes and fibroblasts and thickening of the gliomatous zone, its prolongations penetrating into the spinal substance. Both the diffusion and the variety of these alterations the author thinks can be attributed to a chronic syphilis of hereditary form characterized especially by vascular lesions. This later chronic condition must have had its acute phase in that fetal period. Next, the vascular condition of the periventricular white substance and considerable dilatation of the perivascular spaces. The fetal brain was Other alterations also seem to be the result of an acute inflammation. These are the neuroglial proliferation in the cortex and about the vessels arrested in its development by the luetic meningo-cephalitis and the internal hydrocephalus. To the direct action of the spirochetes is added the retention of the debris which the cerebrospinal fluid should remove.

This description approaches that of the juvenile form of amaurotic idiocy of Tay-Sachs, but in the case reported the nerve cells have not the typical form of those in the Tay-Sachs disease nor is there the same degree of optic degeneration. The clinical similarities to general paresis are the progressive character of the dementia and the epileptiform attacks. The anatomical ones are the cortical degeneration, the disappearances of many cells, the gliomatosis of the marginal zone, hydrocephaly accompanied by granulations of the ependyma and the degeneration of the fibers. But in general paresis there is a much more complete cortical destruction. In the vascular alterations also the difference is evident between that of cerebral syphilis and general paresis. The patient under discussion does not therefore belong under the idiocy of Tay-Sachs nor under general paresis. The spastic paralysis is probably the result chiefly of the degeneration of the pyramidal tracts. The author suggests that the pathogenesis of idiocy may depend also upon the amount of white matter as well as the gray, that is upon the association fibers. It is the lack of these which actually interferes with thought processes. The bad state of the circulation has been accountable for the later neuroglial proliferation, which followed the first aplasia of the fibers. The diminution of the tension, occasioned at first by the internal hydrocephaly, the destruction of the white substance, does not explain sufficiently the extension of the furrows nor the striking disproportion of the cortical surface as compared with that of the white substance. It would seem that the furrows serve to nourish the brain and gain in depth and ramifications as this becomes more difficult.

Thus the author summarizes: Congenital spastic paralysis of a hereditary syphilitic origin is a morbid entity. It is generally associated with idiocy and it is progressive. The development of the central nervous system is retarded and there is degeneration of those fibers which are myelinated more slowly, particularly of the pyramids and the long associative tracts. The vascular walls are thickened and there is visible evidence of a former luetic meningo-encephalitis without gummatous formation. [J.]

**Mendicini, A.** PSEUDO-TABES OF TRAUMATIC ORIGIN. [Il policlinico, Feb. 1, 1918.]

A traumatic lesion of the cauda equina may simulate in its clinical aspects a sclerosis of the posterior columns. This is a known clinical fact and is further demonstrated in a case recently published by this observer.

The patient, a soldier, presented a syndrome characterized by amyasthenia of the legs, more marked on the right side, associated with hypotonia of the muscles, abolition of the Achillar reflexes and the left knee-jerk, Romberg's sign, ataxic gait, lightning pains, and intermittent paresthesia, with disturbance of sensation in the regions of the fifth lumbar and all the sacral nerves on both sides, but partly also of the third and

fourth right and fourth left lumbar, together with derangement of the functions of micturition and defecation. These phenomena followed a wound by shell splinters of the lower lumbar vertebrae, which at its onset caused a complete paralysis. The resemblance to tabes was so marked that the doubt arose whether the patient might not have been the subject of a latent form of locomotor ataxy, but against this supposition it was ascertained that previous to the injury he had no symptoms referable to the nervous system; moreover, the Argyll-Robertson sign was absent. The seat of the injury and radiographic examination pointed, on the other hand, to a lesion of the cauda equina, the fibers of which were either contused by the fragments of shell, which were numerous, although it is more probable that these produced an endothelial hemorrhage. To this and the shock of the wound itself the initial paraplegia was certainly due, which passed off in about three weeks owing to gradual absorption of the blood extravasated into the meningeal sac. In fact, the irritative symptoms (retention of urine, pains, and painful priapism) became gradually lessened without giving place to noticeable paralytic phenomena. The progressive improvement of the patient justified the exclusion of a secondary inflammatory process of the meninges. The pathology of the case therefore resolves itself into one of peripheral radicular pseudo-tabes, which differs from the classic neuro-tabes in the topography of the sensory changes and in the presence of disturbances in the sphincters.

Dr. Mendicini's patient had Romberg's phenomenon and ataxic gait; when in bed, however, or seated, he could move the legs correctly into any position and retained the sense of position except in most of the toes. This fact is of some importance as showing that only the paths proceeding from the terminal segments of the lower limbs were impervious to the transmission of deep sensation; it explains the Romberg sign and disturbance of gait, and demonstrates that if Romberg's phenomenon is met with chiefly in relation to degeneration of the posterior roots it may also be caused by simple plantar anesthesia. On the other hand, the retention in this patient of deep sensibility in the proximal part of the lower limbs gives the reason of the absence of static and dynamic ataxy in the recumbent or sitting posture. In tabes, on the contrary, an ataxic gait associated with Romberg's sign is never met with in conjunction with absolute static and dynamic integrity of the legs in the supine or sitting position, not even in cases of tabes inferior in which the lesion is limited at the onset to the sacral or last lumbar roots.

#### 4. MENINGES.

**Carter, W. W.** SINUS THROMBOSIS FOLLOWING SKULL FRACTURE. [New York Med. Jour., June 23, 1917.]

Following being struck by a truck the patient suffered a fracture of the skull in the right temporal region. There was profuse hemorrhage



from the right ear which continued for five or six days. The patient's condition was apparently satisfactory for about 21 days after the injury when he complained of very severe pain in his right ear, extending down the side of his neck. The temperature which had been normal began to rise and reached 105 degrees. There were no classical symptoms of mastoiditis. Some albumin and hyaline casts in the urine. Operation on mastoid. Antrum and all the mastoid cells found filled with blood. In view of swelling and tenderness in neck and along course of jugular vein and the fact that the lateral sinus showed almost black through its thin bony covering the sinus was exposed. A firm clot about three inches in length removed from near the torcular. Free bleeding immediately occurred. Similar clot removed from direction of the bulb; jugular tied. Cultures made from the clots proved them to be sterile. Two weeks after operation the patient complained of pain in his left ear. Paracentesis followed by purulent discharge (streptococcus). Two days later mastoid complication requiring operation. Mastoid cells filled with pus (streptococcus). Two days after operation erysipelas developed around mastoid wound; under control in five days.

**Kaunitz, J.** MUMPS MENINGITIS. [J. A. M. A., May 18, 1918.]

Orchitis is the most frequent complication in mumps. The rarer complications are meningitis, encephalitis, neuritis, ovaritis, endocarditis, arthritis, nephritis, mastitis, and vulvovaginitis. The meningitis as a complication is little known, and the author has been able to find only thirty cases described, most of these in an article by Acker, in which two of his own cases are reported. As most patients recover quickly, it is probable that the meningeal condition is overlooked. The pathology, as found in the necropsies compiled by Acker, is that of a serofibrinous meningitis, sometimes invading the brain tissue and its basal nerves. The cytologic and chemical tests of the spinal fluid are typical of the inflammatory process in the meninges. The symptoms and signs resemble those of the meningitis of tuberculosis, but the course of the disease is very different. The coincidence or immediate precedence of mumps is naturally suggestive. Other forms of meningitis, particularly the tuberculous and epidemic cerebrospinal forms, must be ruled out. The spinal fluid findings are also characteristic. There may be difficult cases to diagnose, especially if appearing late after a mild case of parotitis. Most cases recover, though temporary neuritis has sometimes appeared, and atrophy of the auditory and optic nerves and hemiplegia have been observed. The gravest forms are those affecting the vital centers. If the substance of the medulla or the vagus nerves are affected death is sure. A better prognosis can be given if the vital centers are only affected by the intradural pressure, and the lumbar puncture, as in three cases here reported. In his comment he says the absence of fever and marked prostration should make one suspicious, when the symptoms, perhaps, would indicate only a gastro-intestinal attack.

**Dench, E. B.** OTITIC MENINGITIS. [Laryngoscope, July, 1918.]

Dench calls attention to the importance of suppurative otitis media in relation to involvement of the intracranial structures, and mentions the fact that from the reports of 19,000 cases of middle ear suppuration, he found that one patient in every eighty-eight suffered from some intracranial lesion—either epidural abscess, sinus thrombosis, brain abscess, or meningitis. Fortunately meningitis is the rarest of these intracranial complications of otitic origin. Broadly speaking, it is any inflammation of the coverings of the brain due to a middle ear infection. One class of meningeal inflammation is a comparatively simple complication and offers no menace to life, while other classes are always severe and invariably terminate fatally. The simplest form presents no symptoms aside from localized headache, local tenderness, sleeplessness, and a slight elevation of temperature, the symptoms often being so slight that the condition is frequently not definitely recognized until pus is found at operation. The spinal fluid in such cases ordinarily shows an increase of globulins and a moderate increase of cell count. In the more severe cases of complication, which are usually of the fulminating type, the symptoms are more pronounced and a cause for alarm. Cerebral manifestations are usually marked, the spinal fluid is found to be under great increase in pressure, is turbid, the cell count is greatly increased, globulins are present, and pathogenic organisms are invariably found. The ideal operative interference seems to be the removal of the primary focus of infection, the exposure of a large area of dura with subdural drainage in cases of the fulminating type, and repeated lumbar puncture in all cases.

**Barron, M.** MENINGITIS IN THE NEWBORN AND IN EARLY INFANCY. [Am. J. M. Sc., 1918, p. 358.]

Although common in childhood, meningitis is very rare in the newborn and in early infancy and then differs in its etiology. In Holt's series of 300 cases of meningitis in infants and young children only 1 per cent. were in infants under 3 months of age, and he concludes that 55 to 70 per cent. are tuberculosis in origin, and that no cases of meningitis due to *Bacillus coli* occur in children over 6 months of age. On the other hand, among 19 collected cases of meningitis occurring in the newborn, Barron found that 7 were due to *B. coli*, 6 to staphylococci and streptococci almost always depending on infection of a spina bifida, 2 to pneumococci, and one each to the meningococcus, *B. lactis aerogenes*, and *B. pyocyaneus*. Adding 20 cases of meningitis in infants under 3 months and 3 cases in infants between 3 and 5 months Barron finds that *B. coli* was responsible for 14 cases, streptococci and staphylococci for 10, the meningococcus for 5, the pneumococcus for 4, and the tubercle bacillus for 3. The important part that the tubercle bacillus plays in the meningitis of later infancy is therefore occupied by *B. coli* in the early months of infant life. The paths of infection in the newborn have not

been definitely established, but infection through the mouth by means of fingers, instruments, and bath water must be guarded against; bacteria may also enter through the alimentary canal, the external ear, and the Eustachian tube. The susceptibility of infants to infections with micro-organisms otherwise only slightly pathogenic may be explained by the feeble production of antibodies during the early months of infancy. The greater resistance of breast-fed infants as compared with those artificially fed is probably due to the compensation of the passive immunization by the breast milk for the active immunization which is still deficient.

**Fildes, P., and Baker, S. L.** MENINGOCOCCIC CARRIERS AND MENINGITIS.  
[Br. Med. J., Oct. 5, 1918.]

A valuable report upon the seasonal outbreak of cerebro-spinal fever in the navy at Portsmouth, 1916-17, has recently been made to the Medical Research Committee by these authors. Their conclusions as to the epidemiology of the disease, based on an enormous number of routine examinations, modify in some respects the current views on the subject, and deserve careful consideration. With the object of minimizing the incidence of cerebro-spinal fever in the service, Surgeon-General Sir Arthur May, the late Director-General of the Medical Department of the Royal Navy, ordered that the throats of all new entries should be examined so as to detect meningococcic carriers. In accordance with this regulation, an average of 270 new entries were examined weekly at Portsmouth during 1916 and 1917, and an opportunity was thus provided, and utilized to the full, of throwing fresh light on problems associated with the disease. The probably unique experience of examining swabs from the throats of twenty-six cerebro-spinal fever patients, at intervals of from two to seventy-five days before the onset of symptoms, gave a negative result in every instance, and among 485 known carriers no case of the disease, or of slight meningeal symptoms suggesting a mild meningococcic meningitis, occurred. These observations are important in controverting the rather widespread assumption that a carrier stage precedes the onset of the disease, and in proving that the interval between infection of the throat and systematic generalization, or the incubation period, may be very short. Further, the throats of the patients a few days after the onset of symptoms were as often as not free from meningococci, and were seldom so heavily or persistently infected as ordinary carriers; for this and other reasons it is highly probable that a patient is not responsible for the presence of carriers among his contacts. No direct evidence was forthcoming of infection of an individual from a patient, and it appears that a case is more unlikely than a carrier to spread the disease. A close relation is shown to exist between the frequency of meningococci in the throats of the general population and the incidence of cerebro-spinal fever; both are high in the winter and spring, and low in the summer. During a transient epidemic of carriers an individual occasionally develops cerebro-spinal

fever, which is therefore a more or less accidental by-product of the throat epidemic, and here it may be recalled that the special Advisory Committee of the Medical Research Committee "upon bacteriological studies of cerebro-spinal fever during the epidemic of 1915" stated that "the epidemic is not one of cerebro-spinal fever as such, but what may be termed a 'saprophytic epidemic' of the meningococcus in the throats of the population at large." Drs. Fildes and Baker conclude that when a case of cerebro-spinal fever occurs, it is because a susceptible person is in contact with a high proportion of carriers. New entries are especially prone to the disease: thus out of 46 cases 36 were in new entries, and the authors consider that this etiological factor is more important than youth. The average duration of the positive state among 360 carriers was 1.3 months, there being 212 mild carriers with an average duration of 0.45 month and 148 chronic carriers with an average duration of 2.6 months.

The authors confirm Lieut.-Colonel M. H. Gordon's contention that practically all meningococci found capable of causing the disease belong to one of four types, and from this it follows that practically all cocci which cannot be shown to conform to one of these four types are incapable of causing the disease, and that Gordon's four types are of great importance in practical diagnosis. But for general epidemiological purposes they consider that pathogenic meningococci consist of two groups, thus agreeing with Andrewes and others, containing Types I and III and Types II and IV respectively, corresponding to the meningococci and parameningococci of other authors. Of the 46 cases 29 belonged to Types I and III and 16 to Types II and IV, but among their contacts the carriers of Types II and IV were very much commoner than the carriers of Types I and III, which must therefore be considered to be more pathogenic.

The great bulk of the epidemic and sporadic carriers were due to the less pathogenic Types IV and II meningococci, the more pathogenic Types I and III meningococci only appearing in epidemic numbers during the winter. The results of treating carriers by antiseptic sprays were disappointing, as it appears that 33 per cent. of the carriers recover without any treatment, while 40 to 50 per cent. are cured by any form of treatment; the difference between these two recovery rates it is considered is due not to the efficacy of treatment, but to the fact that the two figures are calculated from two different series of men. It would be interesting to hear what practical measures in dealing with the whole carrier problem appear most advisable in the light of these various observations.

A study of 106 out of 500 strains of meningococci isolated from the nasopharynx shows that while Flexner's serum practically always agglutinates true meningococci, a positive result cannot be regarded as absolutely diagnostic of epidemic strains, because a considerable proportion of the throat strains so agglutinated cannot be classified by Gordon's absorption tests—in other words, it gives too many carriers. As a

means of diagnosis agglutination tests with the patient's blood serum appear to be valueless. Staff Surgeon Adshead gives a good clinical account of 71 cases treated almost entirely by Flexner's serum with a mortality of 19, or 26.7 per cent., but an attempt to discover if there was any conformity between the type of meningococcus found in the 46 cases mentioned above and the clinical symptoms and mortality did not lead to any conclusion.

**Bradley, D. E.** MENINGOCOCCUS CULTURES. [J. A. M. A., June 15, 1918.]

Bradley reports her experiments made as to the prolongation of life and viability of meningococcus cultures. Her attention was called to the subject by the apparent affinity of these organisms to nervous tissue. Both deep brain and deep blood mediums were used. "The deep brain medium, according to von Hibler, is thus prepared: Beef brain is chopped fine, and one third the volume of distilled water is added. The mixture is tubed in lots from 12 to 15 c.c. and sterilized, preferably in the Arnold sterilizer, three successive days. Before we plant into this medium, it is customary in our work to transfer a loop of brain to agar medium and incubate twenty-four hours to detect any contamination." A table is given showing the viability of meningococcus cultures in days at 37° C., room temperature, and ice-box temperature, which has been considered as slight by authorities. The method and technic of testing is described. She finds, however, from her tests, as far as she has gone, that even in deep brain cultures which are the most favorable, meningococcus is longer lived at 37° C. than at room temperature or in the ice box, but that the fact that deep brain cultures can be kept alive for many days at lower than body temperature is important.

**Shearer, C., Crowe, H. W.** THE RÔLE OF THE PHAGOCYTE IN CEREBRO-SPINAL MENINGITIS. [Proc. Royal Soc. Biol. Sci., Series B, Vol. 89, No. B, 619.]

These experimenters have sought to obtain light on the mode of entrance of the meningococcus into the spinal canal. The membranes enclosing the spinal fluid appear impenetrable to this organism nor has any filterable virus form been found for it, in which it might penetrate. The absence of meningitis as a frequent complication of streptococcal septicemia disproves that the blood or lymph streams are the means of passage. Leucocytes however pass readily through the spinal membranes. In cerebro-spinal fever there are many polymorph leucocytes present in the spinal fluid and these are found frequently to contain many meningococci, which show no obvious signs of degeneration or digestion but which stain as readily as those lying free without the phagocytes. The literature points to the fact that under certain conditions meningococcus like other organisms can remain alive within the phagocytes.

The object therefore of these experiments was to demonstrate the viability or non-viability of these meningococci within the leucocytes

in cerebrospinal fever. These experiments are outlined in detail and the results carefully described and illustrated graphically and in tabular form. Having found that nearly all strains of meningococci are killed by an 0.85 per cent. solution of NaCl, this was utilized to remove from the experimental cultural medium any meningococci which might have escaped ingestion by the leucocytes. These washed leucocytes were then left upon the medium after being washed with a 1 per cent. sterile glucose, which is able to disorganize and kill the leucocytes without injuring the meningococci within. The growth after this upon the cultural medium of a goodly number of the meningococci proved that they must have been set free in a living condition when the leucocytes were disintegrated. Further experiments were made to remove questions of error. They proved that leucocytes are alive in the clear spinal fluid free from pus cells and therefore active for the experiment. Repeated experiments in different forms substantiate the fact that under certain conditions the meningococci can be taken up by the leucocytes and remain intact. In the fresh spinal condition they are not readily ingested by the leucocytes, but with old laboratory cultures there is rapid ingestion followed very soon by death and complete digestion of the germs. Nasal strains examined showed usually the same phenomena in the case of chronic "carriers." It was found that the further removed the organism is from the original case in which the disease occurred the more susceptible is it to ingestion but also the more readily does it succumb to the lethal action of serum or to serum and leucocytes together.

It is in the presence of normal serum that the germ is readily ingested by the leucocytes. In the intermediate stage between the virulent stage when the organism resists attack and the late stage in the "carrier" throat when the germs are destroyed as soon as ingested, infection produces the disease. The leucocytes probably pick up the germs in the nasopharynx and carry them in a viable condition, which may last as long as 60 hours, into the spinal canal. There the organisms are liberated by bursting open the leucocytes as they grow out in dense masses and set up the disease, at the same time reacquiring their power of resistance to the leucocytes in the presence of normal serum.

**Shearer, C.** THE TOXIC ACTION OF DILUTE PURE SODIUM CHLORIDE SOLUTIONS ON THE MENINGOCOCCUS. [Proc. Roy. Soc. Biol. Sci., Series B, Vol. 89, No. B, 619.]

Shearer's experiments confirm the toxic action of dilute sodium chloride upon the meningococcus if the concentration of the salt is not below 0.9 per cent. NaCl. Freshly isolated strains could resist this toxic action seldom longer than 20 minutes, but old laboratory cultures would hold out for three or four hours. Yet this germ is accustomed to just this concentration in the body fluids and it is also able to resist the action of distilled water for many hours. It is necessary in experimenting to have the NaCl absolutely free from impurities, which includes



care that no traces of antagonizing salts shall be brought over from the culture medium of the meningococcus. There must also be care not to dilute the NaCl solution by too large a quantity of the emulsion containing the germs. Clumping of the germs must also be avoided. Certain experiments showed how readily the NaCl was rendered harmless by even a very small trace of a bivalent salt such as  $\text{CaCl}_2$ . This antagonizing action of the bivalent salt is accelerated by the addition of KCl. The toxic action of NaCl is believed to depend upon the Na action previously investigated by Loeb, Wasteneys, Osterhout and others. Experiment also strikingly showed the almost total failure of this toxic action if a 1.5 per cent. solution of NaCl was used, a standard strength for opsonic work. Further tests made with distilled water showed that the meningococcus as a rule resisted its destructive action for many hours, although there was considerable difference in the resisting power of different strains.

**Gates, F. L.** ANTIMENINGITIS VACCINATION; AGGLUTININS IN THE BLOOD OF CHRONIC MENINGOCOCCUS CARRIERS. [Journal of Experimental Medicine, Oct., 1918.]

Gates describes the use of a meningococcus vaccine suspended in salt solution which was given as a prophylactic to about 3,700 volunteers at Camp Funston, Kansas. Preliminary trials were made on a small group of men to establish the proper dose, and the vaccine was finally given subcutaneously in three injections of 2,000 million, 4,000 million, and 4,000 or 8,000 million cocci at weekly intervals. The reactions were usually mild. The first injection appeared to cause less general and local reaction than the typhoid prophylactic, and the second injection caused even less discomfort than the first. The question of individual susceptibility from doses which caused no general discomfort in the great majority of the men. In such cases the symptoms were partly those of meningeal irritation, and sometimes simulated the onset of meningitis. A study of the blood serum of vaccinated men showed that specific meningococcus agglutinins were demonstrable, as compared with the serum of normal controls. An interesting point is the demonstration of agglutinins in the blood serum of chronic meningococcus carriers. Evidence is thus adduced that the relative immunity of meningococcus carriers to epidemic meningitis may be owing to the presence of specific antibodies in the blood stream.

**Kolmer, S. A.** SERUM TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS. [Med. Soc. Pa., Sept., 1918. J. A. M. A., Nov. 30, 1918.]

The serum treatment of epidemic cerebrospinal meningitis by the intraspinal route of injection has reduced the gross mortality of 70 to 90 per cent. among patients not treated with serum to 30 per cent. or less. The problem is complicated because more than one type of

meningococcus is capable of producing the disease, and by the fact that the microorganism may be carried and disseminated by convalescents and by healthy carriers. It is highly important to employ a potent polyvalent serum in the treatment of meningococcus infections because at the present time type diagnoses and the employment of monovalent serums in treatment are not yet available as in the diagnosis and treatment of lobar pneumonia. Investigations in the Army and Navy have shown that the majority of cases of meningitis are due to previous contact with a patient or a healthy carrier of the coccus. During epidemics of the disease between 1 and 2 per cent. of persons are chronic carriers and these constitute the greatest source of danger. Treatment and management of the chronic carriers are as puzzling as of the healthy carriers of virulent diphtheria bacilli. The successful treatment of meningococcus meningitis with serum depends largely on early diagnosis and the proper administration of sufficient serum of high potency and polyvalency. With the least clinical suspicion of meningitis the physician should resort to spinal puncture without delay. The microorganisms are regarded by Flexner as infecting the meninges by direct extension along the lymphatics of the olfactory nerves with their occasional presence in the blood stream; recent studies, particularly of Herrick and Baeslack indicate that the coccus may be present in the blood more frequently than heretofore thought and that this "meningococcus sepsis" may produce systemic symptoms. It is my custom to culture the blood routinely at the time of spinal puncture. If after two intraspinal injections of large doses of antiserum improvement is not shown clinically and in the analysis of the cerebrospinal fluid, I advise that the serum of a second manufacturer be substituted, hoping that the second serum may contain specific antibodies for the particular type of meningococcus producing the disease which were absent from the first serum.

**Austrian, C. R.** EXPERIMENTAL MENINGOCOCCUS MENINGITIS. [Bulletin of the Johns Hopkins Hospital, Aug., 1918.]

Austrian found that the cerebrospinal canal can be infected by way of the blood stream. It was impossible to infect the normal cerebrospinal canal of rabbits by intranasal injection of the meningococci. The demonstration of meningococci in the nasal secretion is to be regarded as an evidence of their excretion by this route, but the conclusion is not necessarily warranted that the organisms find a direct portal of entry to the meninges through the nose. When the animal is normal, the presence of a bacteremia does not lead to the development of meningitis, but when hyperemia of the thecal vessels exists, meningeal inflammation may result. This may explain in a measure the occurrence of the disease in some persons exposed, while others who come in contact with the same sources of infection remain well. Austrian says that his experiments suggest the probability that epidemic cerebrospinal meningitis,

occurring in man, is to be regarded as a metastatic disease developing in the course of a general infection.

**MacNab, J. C.** CEREBROSPINAL MENINGITIS COMPLICATING MASTOID EMPYEMA. [Med. Jour. South Africa, Nov., 1917.]

A boy of six years was admitted to the hospital with symptoms pointing to meningitis, with a running ear, tenderness and pain over the mastoid. The mastoid was opened with free exposure of the lateral sinus and the posterior surface of the pars petrosa. The mastoid contained pus under tension. A lumbar puncture was made. The fluid came out under considerable tension and was very distinctly turbid. Streptococcal meningitis was suspected. Accordingly the temporo-sphenoidal and cerebellar region was decompressed, this double decompression being done preliminary to incision and drainage of the sub-arachnoid space. Cultural examination of the spinal fluid showed meningococcus of ordinary cerebrospinal meningitis. During the week 150 c.c. of cerebrospinal fluid was withdrawn and 50 c.c. of meningococcic serum injected (on different days). The child recovered rapidly and on the eighth day was practically well.

**Wooley, Paul G.** PNEUMONIA AND MENINGITIS. [Journal of Laboratory and Clinical Medicine, July, 1918.]

Wooley, in discussing the pneumonia and meningitis problem at Camp Greene, compared the situation there with that reported in various camps throughout the country. He believed that the best preventive method against pneumonia was to send all recruits to a camp where, for a certain period, they would start training and at the same time the upper respiratory passages of all the men should be disinfected as thoroughly as possible without regard to bacteria. This plan had been tried in Casual Camp No. 1 at Camp Greene, and seemed to have been effective, as there had been less pneumonia there than in the rest of the camp, and measles and mumps, which appeared in the casual camp in contacts from other camps, declined more rapidly in the casual camp than elsewhere. Apparently in attacking the pneumococci and meningococci in the nasal passages all the infections of the upper respiratory tract were influenced. Wooley emphasized what so many other writers did, the importance of pneumonia and meningitis prophylaxis. As both diseases were due to the invasion of the upper respiratory tract by bacilli, the only method for preventing their spread was to apply antiseptic methods to the nose and nasopharynx; and this treatment should be put into practice before the season of the year in which diseases of the upper respiratory tract became widespread.

**Graves, S.** INFECTIOUS MENINGITIS—A STUDY OF 27 CASES IN 586 AUTOPSIES. [Jour. Lab. and Clin. Med., Oct., 1917.]

In this series the infectious agents were as follows: *Pneumococcus*, 11 cases; *tubercle bacillus*, 6 cases; *meningococcus*, 3 cases; *streptococcus*, 3 cases; *bacillus mucosus capsulatus*, 1 case; *staphylococcus aureus* and *streptococcus* combined, 1 case; *treponema pallida*, 1 case; undetermined, 1 case. The probable route of infection to the meninges was as follows: Traumatic (fracture of frontal bone, fracture of temporal bone, fracture of base of skull), 3 cases; hematogenous (generalized tuberculosis, acute endocarditis, syphilis, etc.), 14 cases; direct extension (otitis media, nares), 7 cases; undetermined, 3 cases. The prominent symptoms were the following: Fever, high in all except one in which it was subnormal. Highest temperature was in tuberculous meningitis (107). Headache, rigidity of neck and back, Kernig, contracted or dilated pupils, vomiting, motor reaction to cortical irritation, delirium, coma, hyperesthesia, pathological spinal fluid. Correct ante-mortem diagnoses were made in 100 per cent. of cases in which proper lumbar punctures and spinal fluid examinations were made. They were not made in 70 per cent. of cases in which such examinations were not made.

**Reade, A. G.** EPIDEMIC CEREBROSPINAL MENINGITIS. [Journal of the Royal Sanitary Institute, Feb., 1918.]

The author says that previous to 1914 experience of cerebrospinal fever in Great Britain was mostly limited to sporadic cases and a few epidemics, the largest epidemic being in Glasgow in 1908. The unhygienic conditions, however, brought about by the mobilization and concentration of men in large naval military depots and camps favored an outbreak of the disease in epidemic form. Reade deals with an outbreak at the naval barracks at Chatham, England, and suggests the following methods of prevention: (1) Increased sleeping accommodation is a matter of the first importance. It was found that under the stress of mobilization the cubic air per man had been greatly reduced, sometimes to 320 cubic feet. The men were therefore thinned out by sleeping them in tents, drill shed, gymnasium, bowling alley, and gunnery school until more permanent tents were put up. These provided for the men to have, at least, 500 cubic feet per man, and since 1914 this has never been reduced and is the minimum that should be allowed. The ventilation was improved and supervised by frequent visits of a medical officer and a patrol of sick berth attendants during the night. (2) Disinfection. The room in which a case occurred was shut up, if possible, for two days. On the first day the windows, ventilators, fireplaces, etc., were closed up and formaldehyde vapor generated for twelve hours. The room was then washed down with izal solution and left to air for twenty-four hours. Meanwhile the bags and hammocks were disinfected. (3) Isolation of contacts. All immediate contacts were sent to hospital for bacteriological examination and in addition all men in

the room were examined. (4) Frequent examination of men to detect carriers. With a large number of men it is impossible to examine them all, but it is hoped that in a short time all men will have their nasopharynx examined before they are sent on draft. (5) Special care of delicate new entries. All new entries, boy seamen, boy servants, and stokers, are examined daily and any looking ill or anemic, or suffering from catarrh, are isolated in a special mess, are relieved from all duties, and generally cared for until their health improves.

**Acuña and Casaubon.** FOCALIZED AND LOCALIZED MENINGITIS. [Arch. de Med. d. Enfants, April, 1918.]

The chief feature emphasized by these authors is of lesions inside the ventricle, without communication with the skull and spinal canal. This form, already described in adults, also occurs in infants and children. Several walled-in foci may be present and serotherapy as usually practised does not reach them. Necropsy shows, besides the walled-in suppuration in the ventricles, adhesions along the spinal meninges, with formation of isolate pockets. Lumbar puncture is usually negative. In infants the meninges develops insidiously and escapes recognition for some time.

## 5. BRAIN.

**Stenvers, H. W.** A CASE OF BASILAR IMPRESSION. [Nederlandsch Tijdschr. voor Geneeskunde, 1916, LII, p. 1733.]

A peculiar deformity of the bones of the base of the skull has long been known to anthropologists under the name of basilar impression or plastic deformity. Virchow collected cases among the skulls of the aborigines of Germany in 1876, and the condition is described by Grawitz (Virchow's Arch. f. Path. Anat., 1880, LXXX, p. 449). It has been theoretically held to be due to osteomalacia, hydrocephalus, or to retardation of ossification; but its cause is still unknown. The case recorded by Stenvers has the outstanding features that an adiposogenital syndrome co-existed with an atrophied infundibulum and a macroscopically and microscopically normal pituitary. A girl of 17 had never menstruated, and had recently become abnormally fat. Admitted on April 20, 1915, with papillitis. At end of July, 1914, severe headaches which increased in August; giddiness, vomitings, and epileptoid attacks then came on; later, paræsthesiæ in right face and shoulder. In October, 1914, diplopia and strabismus; the adiposity had recently appeared. In early November, 1914, diplopia increased. In spring of 1915 a marked sensation of hunger and tiredness; this increased, and the girl felt ill; her eyes became very prominent. Physical examination on April 23, 1915:—brown discoloration of skin, marked exophthalmos, excessive general adiposity, left homonymous hemianopia, temporal fields constricted, especially R. Right field constricted for colors; old neuro-retinitis; bilateral defect of vision, not improved. Left pupil

feeble light-reaction; right pupil feeble convergence-reaction. Divergent strabismus; nystagmoid movements, chiefly to L. Right hearing diminished (otitis externa). Tongue comes out to R. Movement of head to left shoulder weak. Breasts moderately developed; pubic and axillary hair absent. Abdominal reflexes normal; plantars flexor; Oppenheim's reflex positive. Later, changes occurred in the visual fields for colors. Cotton-wool sensibility diminished over skin of root areas of L 5, S 1, 2, 3. A skiagram showed changes in sphenoidal sinus region. On the strength of these signs which pointed to a lesion of, or in the neighborhood of, the pituitary body, operation was performed. Death a few hours later. Necropsy:—no trace of a tumor anywhere. The base of the skull showed a marked prominence, due to the pushing upwards of atlas and axis, and also of parts of the occipital and temporal bones. There was a furrow on the base of the brain corresponding to this bony deformity. The right trigeminus nerve was thinned. Internal hydrocephalus. Floor of infundibulum thinned. Pituitary normal macroscopically and microscopically. Thyroid gland marked colloid degeneration. Other internal organs normal.

*Conclusions.*—(1) The adiposo-genital syndrome can exist without any changes in the pituitary body. (2) In the writer's case the adiposo-genital syndrome was accompanied by atrophy of the wall of the infundibulum in the third ventricle. (3) From the evidence of other observations it is probable that there are important centers in the infundibulum for the innervation of the autonomic system. (4) It is possible that the adiposo-genital syndrome is due to the destruction of this infundibular autonomic center. (5) So long as the origin of the atrophy of the walls of the third ventricle is unknown, it is an open question whether this is due to the basilar impression, or whether the basilar impression is itself due to the trophic disturbances.

LEONARD J. KIDD (London, England).

**Crinkshank, John.** WATER CONTENTS OF SOME NORMAL AND PATHOLOGICAL BRAINS. [Rev. of Neur. and Psych., 15, No. 1.]

The whole of the gray or the white matter, as the case might be, from each of the five portions, obtained as described in the preceding paper, was spread on glass plates in as thin a layer as possible and carefully weighed. The plates were then placed in a Hearson electric drying oven, then temperature of which was maintained at about 90° C. A current of dry hot air was passed into the oven from a fuse attached to a small motor. After 15 to 20 hours' exposure the plates were removed from the oven, and the solid material which remained was carefully and completely scraped off. It was then allowed to cool in room temperature and weighed. The material was returned to the oven for some hours, again removed and allowed to cool. This procedure was continued until the material attained a constant weight at room temperature. The percentage of water in each sample was then calculated.



TABLE I.—*Showing the Percentages of Water in the White and the Gray Matter of the Different Portions of the Cerebral Hemispheres of Normal and of Pathological Brains.*

Brain	Frontal		Pre-central		Post-Central		Occipital		Temporal	
	White	Gray	White	Gray	White	Gray	White	Gray	White	Gray
Normal, 25. . . . .	73.1	82.8	71.6	81.4	71.2	79.6	70.8	81.7	72.9	81.1
" 26. . . . .	70.7	81.5	70.2	81.5	70.5	81.5	69.8	80.7	73.0	82.3
" 28. . . . .	72.0	81.4	71.4	81.1	70.8	81.1	71.3	80.4	73.5	81.6
" 30. . . . .	73.0	83.2	72.1	83.0	71.6	82.3	72.8	81.7	75.9	83.5
" 34. . . . .	73.5	84.6	75.2	83.7	72.4	83.3	72.3	82.5	74.5	83.6
Pathological, 16. . . . .	72.1	82.4	74.5	81.5	...	...	72.9	80.9	...	...
" 17. . . . .	74.9	82.7	73.4	81.9	72.9	81.8	76.2	81.9	74.0	83.4
" 19. . . . .	77.7	83.4	76.0	82.1	75.4	83.4	75.1	82.7	78.5	83.6
" 20. . . . .	71.2	82.6	70.0	81.9	...	...	71.9	79.9	...	...
" 21. . . . .	77.5	85.8	75.9	85.6	...	...	77.5	85.6	...	...
" 22. . . . .	72.1	81.0	70.0	82.5	71.0	80.2	72.3	81.9	71.4	78.9
" 24. . . . .	73.4	83.2	72.1	83.0	70.0	80.4	71.7	80.8	73.2	80.4
" 27. . . . .	74.2	83.9	71.8	82.4	73.7	82.1	73.0	82.5	75.0	84.1
" 29. . . . .	71.8	82.7	71.4	82.6	69.9	81.4	71.7	82.1	71.2	82.5
" 31. . . . .	69.4	82.2	69.0	81.7	70.5	80.5	67.5	80.2	71.5	81.2
" 32. . . . .	74.1	84.9	76.1	86.3	73.4	85.3	73.5	84.8	71.5	87.1
" 33. . . . .	79.2	85.6	76.9	82.0	75.2	82.4	76.5	82.8	80.0	83.8
" 35. . . . .	75.0	84.2	73.6	84.7	73.5	84.2	73.2	82.9	76.5	83.3
" 36. . . . .	75.9	83.6	75.2	81.5	74.4	80.9	74.2	81.8	74.9	83.6
" 37. . . . .	76.1	86.2	75.2	83.8	75.0	83.2	71.7	85.2	76.0	85.0
" 38. . . . .	74.9	86.8	71.2	85.1	69.2	83.7	72.9	83.6	75.0	84.3

TABLE II.—*Showing the Average Percentages of Water in the White and the Gray Matter of the Different Portions of the Cerebral Hemispheres of Normal and of Pathological Brains.*

Brain	White Matter					Gray Matter				
	Frontal	Pre-central	Post-central	Occipital	Temporal	Frontal	Pre-central	Post-central	Occipital	Temporal
Normal . . . . .	72.4	72.5	71.4	71.4	73.9	82.7	82.7	81.5	81.4	82.4
Pathological . . . . .	74.3	73.2	72.6	73.2	74.5	83.8	83.0	82.2	82.4	83.1
Difference . . . . .	1.9	0.7	1.2	1.8	0.6	1.1	0.3	0.7	1.0	0.7

The tables show that the gray matter contains roughly 10 per cent. more water than the white, not only in the case of normal brains, as has been observed by others, but also in the pathological and atrophic brains.

It was found that the more marked the degree of atrophy of the brain, the greater was the amount of water in the brain tissue. The amount of water was always increased in brains which showed marked atheroma of the basal or other arteries.

CHAS. E. ATWOOD (New York).

Crinkshank, John. RELATIVE AMOUNTS OF GRAY AND WHITE MATTER IN NORMAL AND PATHOLOGICAL BRAINS. [Rev. of Neur. and Psych., 15, No. 1.]

In the work of which the paper is a brief summary an attempt was made to measure by *direct dissection* the relative amounts of gray and white matter in a small series of normal brains, and to compare the results with the findings in brains of cases of mental disease which at post-mortem examination exhibited varying degrees of atrophy. The procedure was as follows: the membranes having been carefully stripped, the pons medulla and cerebellum were removed by cutting through the mid-brain as close to the hemisphere as possible. The hemispheres were then separated by mesial section, and the fluid expressed from the ventricles. One hemisphere was then laid on its mesial surface, and divided into five portions, named, for convenience in reference, the frontal, pre-central, post-central, occipital and temporal portions. Each portion, which weighed approximately 100 gm., was then cut into slices about one tenth of an inch in thickness, one slice only being cut at a time, the rest of the piece, along with the other parts of the brain not actually under examination at the time, being kept in a closed vessel in the ice-chest in order to prevent drying and decomposition. Each slice as it was obtained was laid on a glass plate and cut into smaller portions, and by a combination of cutting and scraping with a sharp scalpel the gray matter was separated from the white. It was found that the fresh unfixed brain gave the best results, as the difference in consistency of the softer gray and firmer white matter in the fresh brain was a very material aid in the separation. The neces-

TABLE I.—*Showing in a Cerebral Hemisphere of Each of the Normal and Pathological Brains (1) the Amount of Gray Matter, (2) the Amount of White Matter, and (3) the Percentage of Gray Matter.*

Brain	(1) Gray Matter (Grammes)	(2) White Matter (Grammes)	(3) Gray Matter (Percentage)
Normal, No. 8. . . . .	327	237	57.9
" " 7. . . . .	290	227	56.0
" " 10. . . . .	275	227	54.7
" " 6. . . . .	254	223	53.0
" " 9. . . . .	253	196	56.3
Pathological, Mr. R. . .	289	259	52.6
" Mrs. T. . . . .	288	205	62.4
" Mr. L. . . . .	287	161	64.0
" Miss T. . . . .	286	173	58.2
" Mrs. D. . . . .	282	163	63.4
" Miss B. . . . .	268	173	60.7
" Mrs. B. . . . .	262	149	63.7
" Mr. C. . . . .	261	173	61.5
" Mrs. A. . . . .	261	174	59.9
" Mr. F. . . . .	235	177	57.1
" Mrs. F. . . . .	218	163	57.2

sity which the use of the unfixed brain imposed of carrying the dissection through in the shortest possible time increased the arduous nature of the work. The gray matter of the basal nuclei (about 20

gm.) is not included in the results. The results are tabulated as follows:

The conclusions drawn from these results are that the atrophy of the brain, which is so common a feature at autopsy in chronic cases of insanity, is due more to the loss of the underlying white than to the loss of the superficial gray matter, notwithstanding the well-known morbid histological changes in the latter. This relatively greater loss of the white matter of the brain in chronic insanity is quite in keeping with

TABLE II.—*Showing the Brains, Normal and Pathological, arranged in three series, in the order respectively of their (A) Amounts of Gray Matter, (B) Amounts of White Matter, and (C) Percentages of Gray Matter.*

A		B		C	
Brain	Gray Matter (Gm.)	Brain	White Matter (Gm.)	Brain	Gray Matter Per Cent.
Normal—No. 8	327	Mr. R.	259	Mr. L.	64.0
“ No. 7	290	Normal—No. 8	237	Mrs. B.	63.7
Pathological—Mr. R.	280	“ No. 7	227	Mrs. D.	63.4
“ Mrs. T.	288	“ No. 10	227	Mrs. T.	62.4
“ Mr. L.	287	“ No. 6	223	Mr. C.	61.5
“ Miss T.	286	Mrs. T.	205	Miss B.	60.7
“ Mrs. D.	282	Normal—No. 9	196	Mrs. A.	59.9
Normal—No. 10	275	Mr. F.	177	Miss T.	58.2
Pathological—Miss B.	268	Mrs. A.	174	Normal—No. 8	57.9
“ Mrs. B.	262	Miss T.	173	Mrs. F.	57.2
“ Mr. C.	261	Mrs. B.	173	Mr. F.	57.1
“ Mrs. A.	261	Mr. C.	173	Normal—No. 9	56.3
Normal—No. 6	254	Mrs. D.	163	“ No. 7	56.0
“ No. 9	253	Mrs. F.	163	“ No. 10	54.7
Pathological—Mr. F.	235	Mr. L.	161	“ No. 6	53.0
“ Mrs. F.	218	Mrs. B.	149	Mr. R.	52.6

our present knowledge of the neuron, when we remember such facts as the association of the myelination of nerve fibers with the acquisition of higher neural and mental function in the process of development, and the essentially nutritive rôle of the body and nucleus of the nerve cell. Further, the figures which have been obtained for the weight of the gray and the white matter in the different parts of the brain, and which are not published, have shown that the loss of white matter is greatest in the occipital, temporal, and frontal lobes, and that the white matter of the pre-central and post-central regions suffers to a less degree.

C. E. ATWOOD (New York).

### III. NEUROSES—PSYCHONEUROSES—PSYCHOSES

#### 2. PSYCHONEUROSES.

Groves, E. R. FREUDIAN ELEMENTS IN THE ANIMISM OF THE NIGER DELTA. [Psychoanalytic Review, July, 1917.]

The author gives an appreciation of a study of the animistic philosophy and conception of life among a people of primitive culture. He

quotes freely from the article as it reveals a recognition on the part of the writer of the principles which Freud has formulated at work among these early peoples. They are reported as highly excitable, very emotional and impulsive so that they are characterized as fundamentally neurotic. In their moods they withdraw into a psychically shadowy life, which they make a reality within themselves, in which they have stagnated for centuries. The author affirms the father element as a controlling factor in religion. The importance of the father in the flesh has passed over into a spiritual conception, passing through ancestor worship to a conception of a Supreme Being the source of all life. Their entire animism serves a subjective purpose, representing the wish motive. Illusion gains a supremacy over the actual so that while they acknowledge the literal they live under the control of the phantasmal. This has both kept them from extreme lapse into savagedom and at the same time prevented their cultural advance. This spiritual system arises out of their unconscious, that is "their own forgotten acts and thoughts unconsciously expressed" as in the psychoneurosis. They are actuated by the reaction of their own sensations and emotions rather than by external reality. Like the neurotic patient they "dream dreams when purposeful, constructive thinking is demanded." There is therefore an unconscious opposition to progress, which becomes partly also conscious. They themselves regard accidental occurrences as actually due to deep underlying purposes looking at an "omission" not as a passive thing but as a "commission" due perhaps to the obtrusion of other mischievous antipathies. Dream life is given very serious regard and their spiritual conceptions are largely due to the dreams. Dreams are to them realities in which actual souls of the dead communicate with the living. It is through dreams that the existence of the soul is assured.

**Starr, M. Allen.** WAR STRAIN AND SHELL SHOCK. [New Jersey State Med. Soc., June 29, 1918. Med. Record, Oct. 12, 1918.]

Dr. M. Allen Starr delivered this oration, in which he stated that the terms "shell shock," "war shock" and "war neuroses" had been coined and had proved very convenient, as they did not commit one to any particular pathology or diagnosis. He discussed the etiology, pathology, and symptoms of the condition, calling attention to the points whereby shell shock might be differentiated from injuries of the brain or cord. He said it was admitted by all investigators that the chief etiological factor in shell shock was the long continued emotional strain. But this produced many pathological effects and could not be dismissed with the label of mere hysteria. Back of the lines before the men got into actual trench service they heard tales of the strain which others had undergone, of the shocks they had suffered, and they saw the wounded and the nervous and mental wrecks coming back from the front. When the man finally got into the trenches he was subjected for

a period of three to seven days to a continuous nervous strain, living in ceaseless noise, in constant danger, with little or no sleep, and in a constant state of excitement and apprehension. Both private and officer were subjected to mental strain to which they were wholly unaccustomed. In this connection Dr. Starr referred to the effect of emotion on bodily activities, reviewing the investigations of Cannon, Crile and Heckel. As Crile pointed out, anger and fear directly affected the adrenals and the thyroid secretion and he likened the condition present in fear to that in exophthalmic goiter, with staring eyes, marked pallor, and the profuse sweat, diarrhea, and general tremor, which he produced in his animals under a state of alarm. [Facts of psychiatric knowledge from ancient times. Ed.] The mental state which had been described as characteristic of the soldier in the trenches was far greater in its intensity of emotional content than that which could be produced in laboratory animals. There were many proofs that each of the pathological effects described by the physiologists as occurring in animals were present in cases of war neurosis and, therefore, in the study of the symptoms it was manifest that no mere dismissal of them lightly with the designation of hysteria in any way met the case. In the study of the symptoms of shell shock we must recognize not merely the mental attitude, not merely the emotional element, but also the physical effects which this attitude and emotion inevitably produced, unconsciously to the sufferer, but none the less manifest to the physician, and we could not expect relief from these symptoms until there was a spontaneous subsidence of the physical and chemical conditions which this emotion had produced. The symptoms which appeared under the conditions of war strain were so numerous and differed so greatly in different cases that it seemed necessary to classify them by distinguishing between the mental and the physical symptoms. The physical symptoms might be divided into motor, sensory, reflex, and sympathetic. The motor symptoms were in many cases most striking from the beginning and included tremor, sometimes active spasmodic contractions, torticollis, shrugging of the shoulders, playlike movements of the arms, kicking movements of the legs, all of which interfered with voluntary movements and resembled regular types of chorea. All these motor symptoms appeared to cease during sleep and many of them could be arrested by hypnosis. Paralysis might appear as a motor symptom, though its characteristics were not those occurring in organic disease, as there was no muscular atrophy, no change in the reflexes, and no loss of electrical response. Marked contractures of a bizarre type of the hands and feet were frequently seen. The gait was peculiar, the feet being dragged along as if weighted, and staggering and falling were common. Among the sensory symptoms the special senses were very often affected, blindness, deafness, hemianesthesia, and mutism being not uncommon. Sudden restoration of sight and also of hearing under hypnosis had convinced

all observers that the loss of sense was functional. The blindness was never attended by atrophy of the optic nerve or a change in the optic discs and the deafness was not attended by vertigo. The reflex symptoms consisted of hyperexcitability of the skin to irritation, resulting in initial pallor, followed by flushing and urticarial-like swelling of the surface, but a loss of skin reflexes had not been observed. The deep reflexes might be slightly exaggerated, but ankle clonus and a Babinski reflex were absent. The sympathetic or vegetative symptoms were marked in very many instances. A rapid, irregular action of the heart, irregular respiration, defective digestion, glycosuria, and polyuria, irritability of the bladder and rectum without loss of control, and symptoms pointing to an irregular and imperfect action of the ductless glands were very common. Both hyper and hypo-thyroidism had been observed. A curious form of aphasia was quite common, in which the patient appeared to be quite unable to utter a word, though able to understand and to write his thoughts and wishes. In organic motor aphasia writing was impossible. There were further evidences that in shell shock there were actual pathological conditions not at all psychical. Mott had recorded a number of cases in which minute capillary hemorrhages had been found in the brain, scattered through both gray and white matter, and hence capable of arresting the action not only of the brain cells which received, stored up, and sent out impulses, but also of the connecting fibers which associated these impulses, and subserved of the memory, reasoning and self-control. Recovery did not necessarily militate against this pathology. Another pathological condition to be considered was multiple thrombi through the brain from gas bubbles. It was known that when, as in caisson disease, an artificial atmospheric pressure was suddenly removed from the body such bubbles formed in the blood, just as when bubbles appeared in champagne when the bottle was uncorked. By observation with aneroid barometers it produced an air pressure of ten tons to the square yard on all bodies within fifty feet. This sudden pressure was followed by a sudden relief of pressure, hence the secondary effect of the explosion was comparable to coming out of a caisson. Thus multiple gas emboli might occur in men in the trenches and throw the soldier into a state like that seen in caisson disease. Here again recovery was not impossible. The *mental* symptoms were particularly common and, though some of the cases were diagnosed as insanity, they did not correspond to the typical forms of insanity. Among the symptoms particularly frequent were disturbance of the consciousness and personality, disturbance of memory, and an emotional condition characterized by great depression and distress of mind. The patients were often content to sit and brood and cry. They had no definite delusions of a melancholic character. It was a primary emotional state rather than a reasoning depression. Relapses into this condition from time to time during the process of recovery were



frequent. Impairment of the will power was another symptom which occurred. The power of self-direction, of control of the flow of thought, of the control of emotions, and even the power of control of voluntary activity was lost. Morbid impulses and morbid ideas were very frequently manifested, leading to the most unusual and irrational acts. Fits of terror were very common in both the mental and the physical cases. This was not a manifestation of cowardice, for a coward preserved his instinct of self-preservation and tried to escape or to protect himself and did not recover his equanimity until he was safe. In shell shock terror there was a complete mental paralysis, with no attempt at safety. As to the treatment, in some complete rest, relief from anxiety, the assurance that return to fighting was impossible, happy surroundings, diversion, productive occupation, and good nutrition were the chief remedies. In others a process of encouragement to stimulate the will was needed. Reëducation was the means of restoring to health many of the victims of shell shock. To-day in England and Canada hundreds of devoted patriotic women were laboring in hospitals with these men, teaching, encouraging, stimulating them to resume normal activity. Preparation for this work was being made in New York City by several agencies. It was not wise to send these patients home to anxious relatives, where a recounting or exaggeration of symptoms only excited interest and there was little stimulation to recovery. Shell shock must be treated by those who were especially interested and fitted by previous training to handle the mental and physical conditions which were so multiform and so perplexing. In every case the will to recover, like the will to win, was half the battle.

**Core, D. E.** INSTINCT DISTORTION OR WAR NEUROSIS. [Lancet, Aug. 10, 1918.]

Core says that these cases resemble hysteria, in that environment plays a dominant part in their development; but they differ from the hysterias, since in the latter the rôle of environment is indirect and since the hysterical phenomena are based on a physiological reaction. In the war neuroses the phenomena are pathological and serve no useful purpose in protecting the consciousness from unpleasantness. The diagnosis of war neurosis is generally comparatively simple, since the symptoms conform to the various motor manifestations of fright. These are divisible into two groups. The first are those associated with flight, and include facial pallor, staring eyes, dilation of the pupils, rapid heart, and muscular excitability, tremor or spasm. The second group includes those fright manifestations associated with the "crouching instinct" such as the inability to move the legs or walk, aphonia, whispering speech or stammering. Careful study of the case will show that, in addition to looking terrified, the patient is really terrified and is specially the victim of terrifying dreams, or even of fear, during the wak-

ing hours. Often he cannot sleep at all at first on account of his fears; later he is able to sleep, but his sleep is only fragmentary and is broken by dreams which awaken him in terror. As improvement progresses he sleeps better but awakens in the morning with memories of distressing dreams. Gradually the element of fear and terror is lost, at first for only part of the time, later almost or quite completely. But when this stage has been reached many of the somatic symptoms, such as stammering, tremor, etc., have become habitual and require correction. The diagnosis of war neurosis should never be made in the presence of definite evidence of actual organic lesions. The treatment of war neurosis is neither very difficult nor very complicated and depends upon whether the patient is ill or is in the habit stage. When in the active or ill stage sleep should be aided by giving 0.6 gram (ten grains) of trional, with or without aspirin, and diminishing the dose as sleep improves. The patient should be kept in bed for the most part, and preferably in a ward with a few other patients. As sleep improves and fear becomes less he should be allowed to leave the ward at intervals and mix with other patients. During all this time he should be encouraged as to his ultimate recovery, and the physician should talk with him frequently and gain his confidence. In the treatment of the various motor disorders during the active as well as the habit stage encouragement, exercise of the parts and painstaking reëducation are the most important measures. Occupation in the experimental workshops is also of the greatest value.

**Campbell, C. Macfie.** THE RÔLE OF INSTINCT, EMOTION, AND PERSONALITY IN DISORDERS OF THE HEART, WITH SUGGESTIONS FOR A CLINICAL RECORD. [J. A. M. A., Nov. 16, 1918.]

Campbell discusses the relation of personality, instinct, and emotion to disease, and especially to disorders of the heart. In disorders which consist of a maladaptation of the patient to his life situation questions arise as to why in one case the symptoms are cardiac, in another respiratory, and in a third gastrointestinal; and whether the patient with cardiac symptoms has a special type of inferiority of the cardiovascular system or the symptoms are dependent on an unsatisfactory instinctive or emotional life, or in most cases are both factors involved. Since, for example, the effect of a terrifying experience varies in different types, the result cannot be explained by a mere reference to the situation but must be considered in relation to the individual. It may well be that the persistence of cardiac symptoms in such cases may be due to a constitutional idiosyncrasy or acquired inferiority. It is important to recognize, moreover, that every experience tends to modify the later reaction of the organism; the patient may be left with an increased immunity or an acquired sensitiveness. (The soldier, unnerved by his experiences with high explosives, may react with extreme sensitiveness to abrupt noises,

and in this reaction cardiac symptoms may predominate.) In considering the relation of heart cases to cases of war neuroses, two factors must be studied: (1) The intimate mechanism of the cardiac inferiority; (2) the emotional and situational factors that precipitate and foster the symptoms. The relationship of the cardiac symptoms to other manifestations of inferiority must also be considered; thus a lack of virility and efficiency may be secondary to an inferior cardiovascular apparatus, or, cardiac discomfort and irregularity may be explained by the undue demands made on the heart by an unstable or oversensitive emotional life or by a sexual life which, owing to the constitutional inferiority of the patient, is not subjected to control. This author has examined thirty-three patients and found that their constitutional inferiority could be referred to three types: (*a*) An inferiority manifested in prolonged physical invalidism, with little or no definite intelligence defect; (*b*) an inferiority in which defective intelligence is a prominent factor; (*c*) an inferiority in which the instinctive and emotional life is of poor quality, while the intelligence is fair. In addition to the clinical aspect of these cases, the military and reconstructive aspect must be considered, and it is advisable, therefore, to include in the clinical record a summary statement as to the personality of the patient, and as to any experiences and situations that seem to have a direct bearing on his disorder. The constitution, or innate equipment of the individual, can be estimated by a study of the stock from which he has sprung, with special attention to the presence of epilepsy, insanity, alcoholism, etc., and his early reactions to the test of life before training and experience commenced to play a predominant rôle. In addition to the nervous efficiency of the patient, his general efficiency as evidenced by his school record and wage-earning capacity should be taken into account; also his behavior to his comrades, his steadiness at work, and responsiveness to standards of honesty, truth, and decency. In estimating the degree of disability caused by cardiovascular symptoms the whole situation must be considered. Obviously, the military situation is an important factor, for restoration to health leads to the trenches and the toil of war, for which the patient has a deep-seated repugnance, however loyal to duty his conscious, official self may be. In civilian life this applies with equal force where the various causes of nervous invalidism are covered up by the conventional explanation of overwork.

## Book Reviews

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**Kellogg, J. H.** RATIONAL HYDROTHERAPY—A Manual of the Physiological and Therapeutic Effects of Hydriatic Procedures, and the Technique of Their Application in the Treatment of Diseases, etc. . . . Modern Medicine Publishing Co., 1918.

It is probable that in his nearly twelve hundred and fifty pages, Dr. Kellogg has brought together more valuable information with regard to hydrotherapy and certain closely related subjects than is to be found in any other work and surely in any single volume. It has all been done in such a way as to make the material readily available for the general practitioner of medicine as well as the specialist, and even to make the lay mind understand the rationale of the use of water internally and externally. Perhaps the most curious thing about it is that this very recent development of hydro-therapeutics which has all taken place in less than a generation is, as Dr. Kellogg has noted in many passages, only a repetition of long past phases of medical history, for all of our hydrotherapy was anticipated long ago. It is very probable that in a great many details, the magnificent Greek health resort at Epidaurus, which dates from 600 B.C., was a forerunner of Battle Creek not only in its use of air and diet and water treatment, but also in its modes of interesting and diverging the mind, for at Epidaurus they had a theater seating some 6,000 and a hippodrome for races of various kinds, seating some 10,000, and manifestly every effort was made to keep the people from thinking too much about themselves.

**Frink, H. W.** MORBID FEARS AND COMPULSIONS. Their Psychology and Psychoanalytic Treatment. Moffatt, Yard and Company, New York.

This book is addressed primarily to physicians but will be found clear and interesting to others as well. It is written from the point of view of Freud rather than of Jung. Its aim is purely neurological and psychological and is free from the discussion of the more theoretic applications of psychoanalysis, as, for example, to education or to art in its various forms. He introduces a new term into psychoanalysis in order to obviate the ambiguities and the deterrent connotations of the word sexual. He offers instead the word "holophilic" to cover the broadest possible sense of the word sexual.

His introductory chapters deal with the Sexual Synthesis, The Unconscious, Two Kinds of Thinking and the Psychology of the Dream. The Mechanisms of Psychopathological Manifestations are then taken up and are discussed under the heads of overcompensation, displace-

ment, projection, introjection, rationalization, defense and distortion mechanisms and transference. Then follows a chapter on the neurosis as a whole, in which it is clearly brought out that the holophilic impulse in normal life is not specific and limited in application, but in the neurosis it has become *fixed* not merely upon an object but upon one aim or type of action and that the neurotic has learned to love and hate specifically too soon.

The next chapter treats of the Psychology of the Compulsion Neurosis, which is called a compensation for doubt in the love life. This is illustrated by the history of such a case, the analysis of which is worked out in detail in 122 pages slightly rewritten from the report in Vol. 4 of the *Psychanalytic Review*. The Psychology of Anxiety Hysteria is then taken up and a hitherto unpublished but a well-described and interesting case of anxiety hysteria follows the theoretical discussion. The mechanisms of dream formation and the gradual but steady psychical growth of the patient under treatment are convincingly outlined.

The final chapter deals with the Theory and Mechanism of the Psychoanalytic Cure and contains a history of the chief trends of practice formerly, when emphasis was put upon the symptom, and now, when it is placed upon the work of the physician in removing the resistance to the bringing of the unconscious material to light. If this is removed the gaps in the memory of the patient are filled, and the significance of his actions becomes manifest to him. The neurotic usually acts in an infantile manner, determined partly by conscience, which is described as a habit and not an instinct. He may therefore be compared to an imprisoned man, whose unhappiness like the neurotic's is due to a sense of guilt. If the analyst can remove the resistance sufficiently to learn in each case what is the cause of the patient's sense of guilt and why he unconsciously considers himself to be guilty, he will be on the track of the infantile habit formation or early crystallization which dominates and gives shape to all subsequent action. Thus he helps the patient to obtain a much more definite view of exactly what he is doing. Psychoanalysis is therefore not merely analytical and diagnostic. If no treatment went further than labelling the patient as infantile in this or that particular, no constructive work could be done. The psychoanalytic treatment is incomplete if the patient is not shown how, as far as possible, to see for himself exactly in what respects his actions are infantile in his relations to society. It is therefore educational as well as analytical.

The subject of transference is treated in this chapter, being regarded as a living over again, in the presence of the physician, of the experiences which have produced the complex and mediated the fixation. This does not mean only a mental living over again as might be presented in the words of the patient reviving images in his mind merely, but means also a physical reënactment of infantile types of reaction

in the behavior of the patient in the presence of the analyst. The author instances the sulky antagonism supervening in a patient after an explanation had been given by the physician and accepted as quite probable. Here was at work a form of negative transference which was but the reenactment of a similar attitude assumed toward his mother when he had been rebuked by her for having spied upon her improperly. The knowledge gained by the patient is therefore to be not merely a revivification of past memories, an intellectual appreciation, but a reliving. If the acts on which the libido is fixed in the unconscious of the patient are thus brought out into actual life, their discrepancy with the social norm is most clearly perceived and realized and they are then re-integrated with the conscious life in a way which no mere lecture or persuasion on the part of the physician can secure.

This is the initial contribution of a physician who has practiced psychoanalysis for a dozen years and shows a highly scientific attitude toward all the problems concerned. It is at the same time written in a style that is lucid, convincing and thoroughly human. It is a most valuable contribution to analytic literature.

The book contains a chapter-by-chapter bibliography assembled at the end of the book and has also exhaustive synopses and a full index.

JELLIFFE.

**Oppenheim, H.** *DIE NEUROSEN INFOLGE VON KRIEGSVERLETZUNGEN.* S. Karger, Berlin, 1916.

This large volume of Oppenheim's on War Neuroses has just come through although started on its journey about two years ago. It is made up of detailed anamnestic considerations of 68 case histories of various types of the neuroses which have been in the public eye for the past four years.

Oppenheim has little to tell us in these 268 pages. The case histories are full of unilluminating details and his standpoint is one with which all neurologists are familiar. He is constantly saying "as I pointed out thirty years ago," and the attitude herein indicated is now very tiresome from its reiteration. One cannot look for any inspiration in these pages. Any observer who has not learned anything new in the science of psychopathology in the past thirty years is hopeless. Yet, at the same time, there is a fidelity to the objective examination and findings which will give the book considerable value from this point of view.

JELLIFFE.

**Kempf, Edward J.** *THE AUTONOMIC FUNCTIONS AND THE PERSONALITY.* Nervous and Mental Disease Publishing Company, New York and Washington, 1918.

The author of this book has performed in a striking manner a service for which both physiology and psychology have been waiting. That



workers in both fields have prepared the way for this the author plainly shows in the material he has gathered from the experimental and observational work of physiologists and psychologists who have already thrown much light upon the close relationship of physiologic function and mental states. Certain physiologists, as Sherrington, Cannon and others, in particular, have been particularly active in this sphere and to their work Kempf especially calls attention and uses it for his bridge-work between the older and newer attitudes. He has here discussed the affective states and even the development of a conscious mental life out of these in terms of the physiologic activities and bodily states.

The autonomic portion of the physiologic apparatus is the one fundamentally concerned in the production and maintenance of affective states and the regulation of their suitable discharge. This portion of the physiologic apparatus is the product of a continuous evolutionary process which has fostered the growth of useful materials and movements and made them more or less permanent, at the same time eliminating through an atrophy of disuse those which were useless or became so. It maintains for the organism a "continuity of postural tonus of the striped muscle as the source of a continuous kinesthetic stream, of the unstriped muscle as the source of a continuous affective stream." It has moreover in its evolutionary history up through higher and higher forms created the cerebrospinal or projicient sensorimotor system as a means for reaching the environment to receive stimulus and act upon the environment in order to satisfy its own biological ends. It does not therefore act in response to emotions which come to it independently and extraneously, not even from the cortex, as has been too long conceived. On the contrary, the emotions come into existence only as the result of the peripheral autonomic reactions.

They depend upon the tonus and tension of the autonomic system, and are indeed the indications of the degree and manner in which these are maintained, whether satisfying the organisms needs and the wishes of the personality based upon these or whether this adjustment is somehow disturbed. They become therefore the guides to a readjustment of both tonus and tension by which a feeling of well being and gratification may again be attained. This necessitates a continual readjustment between the various functional and structural parts of the organism in their participation in the various relationships toward the environment and the carrying out of a purposeful activity toward it. This involves a view of the body as a biological machine which assimilates, conserves and expands energy, with a proper regulation of this through the different functional divisions.

These simple yet profound principles upon which the organism has been prepared and its reactions as determined are made the basis by the author of the explanation and regulation of behavior, an understanding of the psychic states and the successful control and regulation of these

and their disturbances and lack of harmonious activity. And so this becomes the basis for psychotherapeutic readjustment. Men have too often learned only to suppress their strivings in their energetic intensity, which then accepts only a strong but ill-regulated compensatory or substituted striving, an imperfect effort to acquire the desired autonomic tone and tension, which is never thus attained in its most useful energy conserving creative form. Neither is the too easy gratification of wishes the incentive to successful creative striving, the attainment of potency, which the author states as the one secret ultimate goal of every life. This is really obtained through "the art of suitably withholding or restraining the gratification of a wish or craving as well as cultivating its genesis. By restricting certain wishes, the personality retains a dynamic urge which may be so directed that more difficult work may be accomplished than if the wish is permitted an early freedom, and the pressure of the additional craving is lost."

If there is any criticism to launch against this book it is that the author has condensed into it so much forceful expression that sometimes his conclusions may seem too briefly stated. Careful study of the book will however discover that this form of compactness and brevity is rather a stimulus because of the clearness and directness which give force even to the most compact of its statements. This stimulus will make itself constantly felt in a desire to read the book carefully and follow the author's application of its fundamental principles to a new understanding and appreciation of the psychic life, its affective states and activities, in terms of the autonomic functions with all the possibilities and difficulties which are thus explained. The reader will also find himself like the author making a constant practical application of these things to his own daily life, to the psychological problems everywhere pressing for solution and to all forms and manifestations of individual and social life, humor, anger, love, war, religion, and all the small details which constitute these. New light will dawn upon all these and new inspiration too and practical help in the task of coördinating one's personality in its cravings and functioning and new hope will be inspired, that such coördination is the aim and goal, though imperfectly realized, of all the race. One will understand better how "out of the dismal night, humanity is unvirtuously approaching the dawn of a new social era." The interpretation of this struggle in terms of the autonomic functions gives a more definite workable basis than has been so clearly expressed before, for understanding human effort, particularly in the practical psychotherapeutic readjustment of it.

JELLIFFE.

## Notes and News

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### THE AMERICAN NEUROLOGICAL ASSOCIATION

PROGRAMME, FORTY-FIFTH ANNUAL MEETING, JUNE 16, 17 AND 18, 1919,  
ATLANTIC CITY, NEW JERSEY

Presidential Address, DR. JAMES H. MCBRIDE.

1. "Brain Surgery in the War." DR. HARVEY CUSHING, of Boston, Mass.
2. "Problems in the Surgical Treatment of Injuries to the Peripheral Nerves and the Outlook for the Future." DR. CHARLES A. ELSBERG, of New York, N. Y.
3. "Gunshot Wounds of the Head and their Treatment." LIEUT.-COL. CHARLES H. FRAZIER, M.D., M.R.C. CAPT. S. D. INGHAM, M.D., of Philadelphia, Pa.
4. "Infective Neuritis Among Troops on Active Service." DR. FOSTER KENNEDY, of New York, N. Y.
5. "Acute Ascending Paralysis Among Troops, with Pathological Findings." DR. LOUIS CASAMAJOR, of New York, N. Y.
6. "Experimental Hematogenous Meningitis." CAPT. JAMES B. AYER, M.C., U.S.A., of Boston, Mass.
7. "Sensory Changes in Lesions of the Musculo-spinal Nerve." CAPT. ARTHUR S. HAMILTON, M.C., U.S.A., of Minneapolis, Minn.
8. "Nervous and Mental Disease in United States Troops." DR. PEARCE BAILEY, of New York, N. Y.
9. "Some Psychiatric Lessons of the War." DR. THOMAS W. SALMON, of New York, N. Y.
10. "Hysterical Manifestations of Warfare." LIEUT.-COL. ARTHUR F. HURST, M.D., R.A.M.C., of London, England.
11. "The Management of Psycho-Neurosis in the Canadian Army." LIEUT.-COL. COLIN RUSSEL, M.D., C.A.M.C., of Montreal, Can.
12. "The Mechanism of War Neuroses." DR. SIDNEY I. SCHWAB, of St. Louis, Mo.
13. "Neuro-psychiatric Problems at the Front During Combat." DR. JOHN H. W. RHEIN, of Philadelphia, Pa.
14. "The Management of the War Neuroses at the Front." DR. SAMUEL LEOPOLD, of Philadelphia, Pa.
15. "Dynamopathic but non-psychopathic: The War-contribution of Babinski." DR. E. E. SOUTHARD, of Boston, Mass.

## EXECUTIVE MEETING.

16. "Tetany and the Problem of Muscle Stimulation." DR. SMITH ELY JELLIFFE, of New York, N. Y.
17. "The Manic-Depressive Temperament or Constitution and its Relation to Music and the Fine Arts." DR. BRONISLAW ONUF, of Park Ridge, N. J.
18. "Poisoning by Hydrocyanic Gas with Special Reference to its Effects on the Brain. Clinical and Experimental Studies." DRs. SAMUEL W. LAMBERT AND S. P. GOODHART, of New York, N. Y.
19. "Segmental Cerebral Monoplegia." DR. WILLIAM G. SPILLER, of Philadelphia, Pa.
20. "Cerebellar Dyssynergia with Special Methods for its Study and Analysis." DRs. ADRIAN V. S. LAMBERT AND FREDERICK TILNEY, of New York, N. Y.
21. "Congenital Facial Paralysis." DRs. FRANK R. FRY AND MICHAEL KASAK, of St. Louis, Mo.
22. "Hereditary Occurrence of Hypothyroidism." DR. ALBERT M. BARRETT, of Ann Arbor, Mich.
23. "A Psychological Study of Some Alcoholics." DR. L. PIERCE CLARK, of New York, N. Y.
24. "Treatment of Migraine." DR. HOWELL T. PERSHING, of Denver, Col.
25. "An Acute Prison Neurosis of the Anxiety Type." DR. N. S. YAWGER, of Philadelphia, Pa.
26. "The Dementia Præcox Problem." DR. HENRY A. COTTON, of Trenton, N. J.
27. "Contribution to the Study of Cerebellar Localizations." DR. ALFRED GORDON, of Philadelphia, Pa.
28. "The Symbol as an Energy Container and some Suggestions as to the Kinetics of Discharge." DR. SMITH ELY JELLIFFE, of New York, N. Y.
29. "On the Development of a Systematic Terminology for Psychiatric Symptoms." DR. E. E. SOUTHARD, of Boston, Mass.
30. "Chronic Hypertension and its Emotional Substructure." DR. SMITH ELY JELLIFFE, of New York, N. Y.
31. "Morbi neurales: An Attempt to Apply a Key-principle to the Differentiation of the Major Groups." DRs. E. E. SOUTHARD AND H. C. SOLOMON, of Boston, Mass.
32. "A Study of the Factor of Anticipation in War Neuroses." DRs. SIDNEY I. SCHWAB AND NORMAN FENTON, of St. Louis, Mo.

# The Journal OF Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

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## Original Articles

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### PARALYSIS OF THE GLOSSOPHARYNGEAL, PNEUMOGASTRIC AND SPINAL ACCESSORY NERVES WITH CEREBELLAR SYMPTOMS<sup>1</sup>

BY WILLIAM G. SPILLER, M.D.

PROFESSOR OF NEUROLOGY IN THE UNIVERSITY OF PENNSYLVANIA

The chief interest in the following report lies in the evidence it affords of distinct nuclear representations of the motor supply of the soft palate and larynx, and in the rare occurrence of paralysis of the glossopharyngeal and pneumogastric nerves without other cranial nerve palsy except palsy of the pneumogastric portion of the spinal accessory nerve, and without trauma as a cause.

T. K. about 55 years of age, although he is uncertain of his exact age, has been a heavy user of alcohol. During the past five years he has become dull and falls asleep easily during the day. His mentality in some respects is peculiar. During the last draft he registered as 44 years of age, and yet his wife asserts that he is at least ten years older than this.

A tremor of the right hand developed about five years ago. In 1915 he fell from a chair and was unconscious several minutes, and a few days later a lateral tremor of the head developed. The spasms of choking with protrusion of the tongue developed gradually during the last two years. These statements as obtained from the wife differ very materially from those obtained from the patient, but little reliance can be placed on what he says, as his mentality is somewhat affected.

<sup>1</sup> Read before the Philadelphia Neurological Society, November, 1918. In the discussion of this paper Dr. Gilpin announced that he had presented the patient before the society about three years ago, and that since that time the symptoms had developed considerably.

His head moves continuously from side to side and occasionally antero-posteriorly during the waking state. Swallowing is difficult and he chokes readily. He complains of much vertigo. His speech is very slow and words are uttered with difficulty. The facial nerve supply and the muscles of mastication are normal. He has a pronounced nystagmus on lateral movement of the eyeballs and a slight ptosis of the left upper eyelid, the latter possibly is congenital. Dr. Langdon reports that his pupils are small but with normal reactions, and that there are no fundus changes. The sensations of touch, pain and temperature are normal in the face. The tongue can be protruded in an awkward manner to nearly or fully the normal extent. The hard palate is not anesthetic. Taste is not acute in the back of the tongue and may be lost in this part, but the test is very difficult. Taste is preserved on the anterior part of the tongue.

Dr. Grayson reports that the uvula and soft palate are anesthetic and the palato-pharyngeal muscles are paralyzed. A relatively small amount of mucus under these conditions would produce the choking spasms. The recurrent laryngeal nerve is intact, as the vocal cords function properly.

About every thirty seconds the man is seized with a violent choking spasm and the tongue is protruded to the full extent. The spasm relaxes within a few seconds.

Dr. B. A. Randall finds the external ear normal, while the internal ear, especially the left, is slightly subnormal. The Bárány tests, he thinks, indicate irritable and destructive lesions of the vermis and inner aspects of the cerebellar lobes.

The finger-to-nose test shows an intention tremor in each hand. Diadochokinesis is distinctly impaired in each hand. Supination and pronation of the hand are most irregular, sometimes the revolution is extensive, at other times curtailed. If he attempts to place the palm and the dorsum of the hand alternately upon the knee, he makes many mistakes, and may place the palm two or three times in succession on the knee. The grip of each hand is distinctly weak. Tactile, pain, temperature and vibratory sensations are normal in the hands.

The patellar and Achilles reflexes are not obtained on either side. The man has a slight Romberg sign. In walking he shows decided but not excessive incoördination. In bending far backward he flexes the lower limbs very little at the knees. If he is pushed from behind when he is walking forward his gait is not disturbed, but if he is pushed from the front when walking backward he has great difficulty in retaining his balance, and makes many quick steps before he can regain his equilibrium. Cerebellar catalepsy is not obtained. Asynergia is not pronounced in either the upper or lower limbs. In grasping a glass he does not make asynergic movements. When he forcibly flexes the forearm on the arm against resistance and the resistance is suddenly removed (Stewart-Holmes test) the upper limb does not rebound.



The Wassermann test of the blood is medium positive but of the spinal fluid is negative.

The pulse has averaged between 80 and 96, occasionally it has been higher or lower, and the respirations have averaged between 20 and 24, and this has been the condition while the man has been quiet in the hospital.

The inner part of the eleventh nerve is really a part of the pneumogastric nerve and is believed to innervate the soft palate and the larynx. The facial is no longer accepted as the nerve of the soft palate, but there is some doubt whether the soft palate receives its motor nerve supply from the pneumogastric. This is the view recently accepted by Castro and Gama. In a still more recent paper Maurice Vernet states that the soft palate receives its motor innervation from the spinal accessory nerve and its sensory supply from the pneumogastric. The function of the glossopharyngeal nerve is more or less uncertain, and isolated paralysis of this nerve seems never to occur.<sup>2</sup>

It is interesting to note that Gowers in his well-known textbook many years ago stated that the levator palati is supplied by the spinal accessory nerve.

The nystagmus, adiadochokinesis, loss of tendon reflexes in the lower limbs, incoördination of gait, etc., suggest cerebellar disease, and with the positive Wassermann of the blood one is reminded of the case recently reported by Archambault<sup>3</sup> in which the cerebellar cortex showed great cellular atrophy as a result of vascular lesions. The additional symptoms of glossopharyngeal and pneumogastric paralysis might be explained by a syphilitic meningitis implicating the glossopharyngeal and pneumogastric nerves at their exit from the medulla oblongata.

The paralysis of the nerves mentioned with integrity of the vocal cords would seem to imply that the soft palate and vocal cords have not exactly the same innervation; and it would seem reasonable to assume that structures so remote from one another as the soft palate and vocal cords have different representation in the central nervous system, although a distinct group of cells for each structure might be included within the nucleus of the same cranial nerve. The tibialis anticus muscle, for example, evidently has a separate

<sup>2</sup> Castro and Gama. *Revue Neurologique*, April and May, 1917.

Vernet. *Revue Neurologique*, January and February, 1918.

Gowers. *A Manual of Diseases of the Nervous System*, Vol. 2, p. 236. J. & A. Churchill.

<sup>3</sup> Archambault. *JOURNAL OF NERVOUS AND MENTAL DISEASE*, October, 1918.

representation in the nucleus of the peroneal nerve within the spinal cord.

The occurrence of paralysis of the glossopharyngeal and pneumogastric nerves without implication of other cranial nerves is very unusual, but is common in association with paralysis of the lips and tongue in bulbar palsy.

French writers have assigned names to syndromes consisting of paralysis in different forms of the ninth, tenth and eleventh nerves. Paralysis of the soft palate and larynx on the same side is called the syndrome of Avellis, and indicates a lesion of the inner branch of the eleventh nerve, but an addition of paralysis of the sternocleido-mastoid and trapezius muscles on the same side to the above mentioned paralysis produces the syndrome of Schmidt. A still further addition of paralysis of the tongue on the same side, with atrophy, forms the syndrome of Hughlings Jackson, and the syndrome of Collet has been applied to the paralysis by lesion of the last four cranial nerves. Various other combinations of cranial nerve palsy might in this way be designated by proper names.

## THE DISPENSARY AND PSYCHIATRY. AN ANALYSIS OF CASES

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*(Concluded from page 415)*

**General Paresis.**—In this group there are twenty-six cases diagnosed as general paresis. They were studied with the idea of determining particularly whether there was anything in the personality and make-up of the individual which determined whether the general paresis was to be in the nature of a general progressive paresis of a non-psychotic nature or whether it was to be almost wholly a psychosis.

The first consideration, therefore, in elaborating these cases was paid to the onset and to the previous character of the individual. It has been the custom in the past to draw a close analogy between this condition and dementia præcox, particularly in reference to the nature of the dementia. Carrying this analogy as far as possible one is tempted to look into the question as to whether the personality of the individual before the onset of the disease plays any part in determining the quality and the characteristics of the reactions, particularly the mental reactions, which occur as a result of the specific infection in general paresis. It cannot be said that sufficient evidence has been here adduced to definitely decide this matter.

**Make-up.**—However, in these twenty-six picked cases of general paresis, it will immediately be noticed that fourteen have been placed in the chart under the classification "efficient." By this term we mean to indicate that the patients before the onset were efficient, normal, average individuals without unusual traits which could be learned. It is peculiar that in nearly all of these fourteen cases the psychosis is limited to memory defects and some mental deterioration, both of which are expressions of destruction of brain tissue by the disease process with hardly any irritative mental symptoms. These are the cases also which appear to be general paresis with physical signs dominating the picture, the mental signs being greatly subordinate.

On the other hand, an analysis of the other eleven cases shows that the contrary is true. These are the euphoric, bad-tempered, explosively emotional, highly excitable paretics who are usually committed as insane. Of these eleven cases two had a make-up which showed irritability, excitability, inefficiency as workers, and one had a neurasthenic make-up. One was nervous, irritable, easily depressed, immoral and inefficient before the onset, four were alcoholic and poor workers, being inefficient, and two more nervous with alternating periods of depression and excitement. One was neurotic and a morphine addict and one suffered from diabetes and had been drowsy and stupid and easily fatigued and impotent for years before the onset. Of the four who were alcoholic and inefficient, it is interesting to know that their psychosis is almost exactly similar and it is hard to escape the impression that their make-up and alcoholic habits had considerable influence on the nature of the reaction to the specific infection as expressed by their psychoses—for instance, the last patient, age 40, male, was euphoric, boastful, dull, would not work, was indifferent to the needs of his family and was incoherent, confused and disorientated. The patient, age 43, male, presented almost exactly similar symptoms. Another patient, age 49, male, was very noisy, emotional and euphoric. Another and last of these four, age 39, male, in his psychosis was excitable, emotional, silly, walked about the streets with various parts of his clothing missing, drove his horse unharnessed or left other equipment in the stable, wanted to walk across the water, was excited or depressed, confused, etc. It seems very striking that each one of these four cases presenting practically the same personalities and having the same inefficient make-up before the onset of general paresis, when they eventually developed this disease, should have the same symptom complex.

The patient, age 53, male, who suffered from diabetes carried the drowsiness and stupidity, fatigue and impotence from which he suffered for years into his psychosis and this group of expressions of his usual condition before the onset of the paresis continued in an exaggerated form to be the chief symptoms of his mental disease.

The two patients who had a make-up characterized by irritability and emotional instability in their psychosis were extremely excitable, had explosive tempers, were irritable and very restless. Two patients who had make-ups of the manic-depressive type were in their psychosis prone to have periods of depression and excitement.

A woman who was nervous, immoral and inefficient before her trouble sustained an injury to her head before the onset and became

extremely apprehensive, fearful, restless and sleepless, unsteady on her legs and finally had periods of excitement, elation and euphoria.

It would appear unescapable, even from the small number of cases here presented, that it seems a highly probable fact even in so definitely organic a disease as general paresis, that the nature of the mental reaction to the specific disease process will in the individual cases depend to a considerable degree upon the normal, antecedent, mental status of the individual.

There were in this series twenty-one males and five females.

*Age.*—It is a striking fact that the average age of these cases is about 41.7, again adhering very closely to the often confirmed statistical information that the great majority of psychoses developed at or near the fortieth year.

*Onset.*—In twenty of the cases the onset was gradual, in one extending over a period of fifteen years, and in four cases the onset was sudden with aphasia, and in one fairly sudden with remarkably quickly developing inefficiency.

*First Symptom.*—Of the twenty-six cases, seven had as their first symptom, pains in the limbs, neck, trunk or legs. Four began with distinct memory defect, which in this condition is of the usual type in which memory for recent events particularly, and also for dates, is lost. In three the first symptom was insomnia. In one headache, in one incontinence, in one speech defect. In four tremor of the hands, in one irritability, in two sudden inefficiency, and in two the first symptom was an unsteady gait.

*The Laboratory Findings* were positive and constant in practically all of these cases, the only anomaly being in one case where the blood showed a positive Wassermann and the spinal fluid was negative. This patient did not come back for further investigation, so there is no way of saying whether there was a fault in the performance of the laboratory test or whether this case persistently had a negative spinal fluid.

*The Physical Signs* are fairly constant and characteristically present in almost every case, the only important or rare sign occurred in the patient who had sensory changes in the distribution of the fifth nerve in the part of the face over the malar bone.

Of the nineteen cases in which it was possible to obtain a positive history of syphilis, the average time after the initial infection with syphilis subsequent to which the general paresis developed was 15.6 years. The most rapid developmental period was seen in two cases in which a general paresis developed five years after the syphilitic infection. The most protracted cases were two in which

Age	Sex	Make-up	Onset	First Symptom	Laboratory Findings	Physical and Other Signs	Date of Infection
43	Male.	Efficient.	Sudden with aplasia.	Bad mem- ory for sev- eral months prior to aplasia. Inefficient.	Blood Wassermann 3 +, spinal fluid Wassermann 1 c.c. positive Lange. Positive globulin. Pres- sure 2 +, 28 cells.	A.R. Pupil. Very active reflexes. Slur- ring speech with elision.	13 years ago.
46	Male.	Efficient.	Inefficient in his work after attack of pneu- monia two years ago.	Inefficient.	Blood Wassermann nega- tive twice, second one after a provocative injection. Spinal fluid positive 1 c.c. Positive Lange. Pres- sure +, positive globulin. Lange test disappeared after treatment. 21 cells.	Romberg. Tremor. Positive speech.	15 years ago.
44	Male.	Efficient.	Memory lost. Gradual.	Speech de- fect	Blood Wassermann 2 +, fluid Wassermann 2 +, with .2 c.c. pressure +, 42 cells. Positive globulin. Patient did not return for investigation.	Stiffness and spasticity left leg. Babinski and reflex left leg. Tremor. A.R. pupil with irregularity.	12 years ago.
39	Male.	Efficient.	Hands trem- bled when playing cards. Sudden. Tremor of hands. Grad- ual.	Tremor.		A.R. pupil. Romberg. tremor. Ataxia in legs. Positive speech. Bad memory for dates and remote events.	13 years ago.
44	Female.	Efficient.		Insomnia.	Blood Wassermann posi- tive.	A.R. pupil. Romberg 3 +, tremor. Pa- tellars 3 + equal.	18 years ago.
44	Male.	Irritable, bad tem- pered. Ex- citable. Ef- ficient worker. Neuras- thetic.	Gradual.	Tremor.	Wassermann positive.	A.R. pupil. Corneal reflex diminished both sides. Tremor. Hypesthesia to touch over malar bone. Other sensations at this place O.K.	Denied.
40	Female.		Gradual with dizziness and headache.	Headache.	Positive blood Wasser- mann.	Romberg and positive speech.	10 years ago.



Age	Sex	Make-up	Onset	First Symptom	Laboratory Findings	Physical and Other Signs	Date of Infection
34	Male.	Efficient.	Very Gradual.	Two years ago began treatment in our clinic for pains in the arms. Weakness and pains in legs.	Positive blood, spinal fluid and Lange. 80 cells. Positive globulin.	A.R. pupil. Tremor. Pains in arms. Memory defect. 3 + equal patellars.	8 years ago.
30	Female.	Nervous, immoral, inefficient.	Gradual.	Pains in legs. Incontinence.	Blood Wassermann 4 +, 50 cells. Wassermann positive .2 c.c. Positive globulin. Positive Wassermann.	Romberg ataxic gait. Memory defect. Speech positive. A.R. pupil. Absence of the patellars and ankle jerks. Tremor. Euphoria.	5 years ago.
45	Female.	Efficient.	Gradual over 15 years.	Pains in legs. Incontinence.	Positive Wassermann.	A.R. pupil. Memory defect. Gastric crises. Speech defect positive.	20 years ago.
46	Male.	Efficient.	Gradual.		Positive blood.	Speech positive. Euphoria. Pains in stomach, numbness in feet with prickling sensation. Nystagmoid movement. A.R. pupil. Tremor, ataxic gait and Romberg. Memory defect positive.	24 years ago.
39	Male.	Alcoholic inefficiency.	Acute alcoholism one year ago.	Clouded by alcohol, drove horse unharnessed. Memory defect.	Positive blood and fluid Wassermann.	Memory defect. Silly, incoherent speech. Periods of excitement and depression. Disorientation and confusion. Tremor. Active, equal patellars. Positive speech.	Denied.
53	Male.	Efficient.	Gradual, clouded by diabetes.	Pains in back and legs.	Wassermann blood and fluid positive. Fluid .2 c.c. 160 cells. Positive globulin.	A.R. pupil. Left facial palsy, central type. Tongue deviated to right. Left patellar more active than right. Left Babinski. Tremor. Positive speech.	8 years ago.
50	Male.	Efficient.	Gradual.	Tremor of hand.	Positive blood and Spinal fluid Wassermann.	A.R. pupil. Irregular, active, equal patellars. Double clonus. Tremor, Positive speech.	27 years ago

Age	Sex	Make-up	Onset	First Symptom	Laboratory Findings	Physical and Other Signs	Date of Infection
45	Male.	Irritable, nervous, subject to depressions, and excitements.	Gradual.	Insomnia and depression.	Positive blood and fluid. 12 cells. Positive globulin.	A.R. pupil. Irregular left patellar more active than right. Tremor. Pains in back and legs: Preceded onset for nine years.	Denied.
43	Male.	Efficient.	Gradual.	Irritability.	Positive blood Wassermann.	Positive memory defect. Pains all over, especially in back and legs. Depression, inaccessibility, almost mute. Perseveration. A.R. pupil. Irregular tremor.	29 years ago.
34	Male.	Morphine addict. Neurotic.	Colored by morphine habit.	Tremor.	Positive blood and fluid Wassermann. 60 cells. Positive globulin.	Speech positive. Positive speech. Left central facial palsy. Left triceps and biceps greater than right. Right patellar greater than left. Abdominal right side more active than left and ankle jerk more active than left. Ataxia left arm. Positive memory.	5 years ago.
49	Male.	Alcoholic Neurotic.	Gradual.	Unsteady gait.	Positive blood and fluid.	Active, equal patellars. A.R. pupil. Euphoria. Excitement. All symptoms colored by alcohol.	Denied.
37	Male.	Efficient.	Gradual.	Memory lost.	Positive blood, negative fluid.	Impotence. Positive speech inefficiency. All deep reflexes right side greater than left. Right Babinski.	Denied.
35	Male.	Efficient.	Gradual.	Pains in chest and arms.	Positive blood and fluid Wassermann. 76 cells.	A.R. pupil. Ataxic gait. Ataxia, incontinence, active, equal patellars.	7 years ago.
40	Male.	Alcoholic inefficiency.	Gradual.	Pain in head and neck.	Positive blood and fluid Wassermann.	All tendon reflexes very active. A.R. pupil. Positive memory and speech. Emotional. Euphoria.	13 years ago.
43	Male.	Neurotic, emotional.	Gradual.	Insomnia.	Positive blood and fluid.	Positive memory and speech defect. Explosive temper. Headaches. A.R. pupil with irregularity.	22 years ago.
51	Male.	Efficient.	Sudden.	Staggering gait.	Positive Wassermann and blood.	Positive memory. A.R. pupil. Romberg. Ataxia left leg. Difficulty in urinating.	30 years ago.

Age	Sex	Make-up	Onset	First Symptom	Laboratory Findings	Physical and Other Signs	Date of Infection
33	Female.	Efficient.	Gradual.	Pains in neck.	Positive blood and fluid. Increased pressure in fluid. Positive globulin. Fehling's reduced.	A.R. pupil, with irregularities. All deep reflexes. Active, double clonus. Atrophy left arm. Loss of power. Ataxia. Tremor. Positive memory defect. Explosive temper. Attack began 3 months after onset with apoplecticiform attack.	Denied.
35	Male.	Emotional, bad tempered.	Gradual, after a blow on head, which did not cause loss of consciousness.	Memory defect.	Positive blood.	A.R. pupil. Irregularities. Romberg. Active, equal reflexes. Tremor. Positive speech and memory.	Denied.
40	Male.	Alcoholic irregular worker.	Gradual.	Memory lost.	Positive blood and fluid.	Euphoria. Indifference. Explosive temper. Incoherent, perseverating speech. Not defective otherwise. A.R. pupil. Active patellars. Alcoholic tremor. Clonus left foot. Ataxia both arms.	19 years ago.

the disease developed 29 and 30 years respectively after the initial lesion. In seven of the cases the syphilitic infection was denied, but in all of these confirmation of the syphilitic infection was had by positive laboratory findings.

It was not the purpose nor the scope of this report to enter into the effects of treatment of this disease, so that nothing concerning the therapy and its results in these cases is included in this report.

**Dementia Præcox.**—It seems now to be undoubted that dementia præcox is an organic disease of the brain, and whatever its cause, there also seems to be no doubt that the symptomatology of the cases which properly belong under this classification is definite and distinctive. Even so ardent an exponent of the psycho-biological theory of the causation of dementia præcox as Adolph Meyer admits that there are disorders in what he calls the sub-mental functions, such as fits, contractures, visual motor disturbance, disorders of nutrition, hemiplegias, etc., but he further says that these sub-mental disorders only occur because of the association existing between the mechanisms involved in the proper performance of these functions and the primary mental disease.

If one can arrive at a proper conception of Meyer's attitude in this matter from a reading of his article on the nature and conception of dementia præcox, read at the American Neurological Association in May, 1910, it would appear from this monograph that he believes that the primary causative factors in the production of dementia præcox are the psycho-biological considerations according to the principles of the understanding of these mechanisms laid down by Freud and Jung. The following extract seems to best express his point of view. He says: "The differentiation of various disease forms according to special localization of the maximum disorder might as well be the consequence as the cause of a special symptom complex." Meyer is inclined to point to the causation of this condition as a result "of the loss of balance on the ground of habit deterioration, and tantrums, or the more lasting reactions biologically unfavorable to the existence of a normal attitude, etc." He distinctly passes over the histological findings in this disease as being inconclusive and not essential to the production of the mechanisms occurring in the symptom complex known as dementia præcox. He ridicules the attempt of Kraepelin to place this condition in the same class with myxedema and general paresis as conditions in which there is a disturbance of metabolism with the production of poisons involving the brain. He refuses to see how any

poison elaborated in this manner can cause special symptoms. Yet we have just seen in the case of general paresis that syphilis can apparently, in certain individuals, predisposed by their personality and make-up, produce special symptoms. Drawing an analogy, why cannot the poison, whatever it is, which causes dementia præcox, cause in certain predisposed individuals a particular group of symptoms which may, according to the reaction, cause these patients to develop the various well-recognized types of dementia præcox?

The work of Jelliffe and Hoch along these lines is decidedly helpful. Their conception of a pre-dementia præcox character is interesting in this particular connection. The work of Southard, who found that 86 per cent. of his cases (63) of dementia præcox showed coarse and microscopic lesions, and the work of Alzheimer along the same lines leave very little room for doubt, that dementia præcox is essentially an organic disease of the brain and central nervous system. Another investigator, Sioli, as far back as 1909, stated that he found in all of the patients examined of twenty cases of dementia præcox certain evidence of destruction of nerve tissue. Alzheimer and others have pointed out similarities in the pathology of this condition and general paresis. Southard and Alzheimer have gone even further and have found by autopsy explanations by means of the localization of the disease process in the brain for various groups of symptoms occurring in certain cases of dementia præcox, particularly the katatonic types. The more reasonable and probably the most acceptable view at the present time seems to be that dementia præcox is an organic disease of the brain, and that the various mental reactions occurring in this condition are determined by the preëxisting mental characteristics of the individual which we know as the patient's personality or make-up. It has been along these lines and with this conception in view that an analysis of 39 cases of dementia præcox has been made.

It seems eminently proper, therefore, to start with the two most striking cases of the dementia præcox personality which we have. The first one is a boy, 12 years of age, born in the United States, who was brought to the clinic by his mother, for he was very shy, sensitive, obstinate. His mother was out of patience with him because of his day-dreaming and tantrums. The little fellow was bashful, sensitive, refused to play with other children, liked to sit and mope undisturbed, and seemed to live continuously in a world peopled by his own imaginations. He said that the other boys were too rough to play with, that he could not bear even to talk with them, that he would rather talk to himself and commune

with himself than he would with boy friends. His fits of abstraction became so profound that the mother said that he "plays in a world of his own, and that he will not read, write or work."

This boy has done very well in school, had never been demoted, and had progressed favorably until a few weeks ago. The boy had always been peculiar and had always had the characteristics described above. At six he had chorea, but had suffered no other illness. The family history is entirely negative and it has been impossible to find any hereditary considerations of value in this case. The boy came to the clinic two years ago, was lost sight of until this analysis was commenced and on inquiry it was found that he is now in an institution in this state for the care and treatment of the insane. The diagnosis is *dementia præcox*.

It will be noticed that this boy's abnormal, seclusive make-up did not become noticeable until he had reached an age when it was expected of him that he must play and work in rivalry with other boys of his age. It was then that his abnormal condition became sharply differentiated, suggesting a profound lack of adaptability.

The second case is that of a girl, age 17, single, born in Italy. She is one of four children whose parents died of tuberculosis when she was five years of age. Thy both died within a short interval of one another, and the patient's sister immediately assumed charge of her. The parents died in Italy and the patient was brought to this country by an uncle. This uncle remembers distinctly that during the entire trip the little girl never uttered a word in conversation. She was at this time about 7 years old. He remembers losing patience with her on a number of occasions because she would not speak to him. He said that she continually seemed to be thinking about something.

Here in America the girl did well at school and graduated, without being left behind in her classes, at the age of 13. She continued, however, quiet, shy, sensitive, obstinate and "very peculiar." At 14, she entered a trade school and immediately upon assuming her social and educational duties she began to show her first signs of mental trouble. She had a severe attack of depression which lasted for two weeks or more and was not preceded or followed by excitement or elation. During this period she refused food, was greatly retarded mentally and physically and was practically mute. She recovered and almost exactly one year later she had another attack, which this time lasted about a week, and had the same general characteristics. A third attack of mutism and negativism occurred about five months later. In the intervals between the attacks she



continued shy, obstinate, retiring, depressed, moody and abstracted. Her fourth attack began three months before I saw her, just before the Christmas season of 1916. This attack, however, had a prelude of three or four days of, for her, unusual elation, talkativeness and joyousness. This elated period lasted only three or four days, and thereafter from Christmas Day, 1916, until February 16, 1917, when I first saw her, she continued uninterruptedly to be almost mute, inaccessible to conversation and questioning, resistive and emotional, crying almost continuously. She will stay in bed for days at a time, will not comb her hair, or wash her face, refuses food, assumes prayerful attitudes and is dull, stupid and indifferent. Occasionally for a few days she will be again restless, noisy, talkative, smiles to herself and grimaces. This, however, never lasts more than three days. She continually cries for her mother and has hallucinated her mother coming to her in visions, both day and night. She also hears the voice of her mother calling her by name.

The patient has never been able to get along with her sister's husband, and this last attack began with a sharp reprimand from him. She has vague ideas that this brother-in-law does not wish her well and that he neglects no opportunity to torture her by means of scoldings and subjects her continuously to various petty humiliations. The patient eventually became so unmanageable at home that she was sent to a private sanatorium and still continues in practically the same condition, the attack having lasted eight months. It was later found out that the patient's uncle is now in an insane asylum in Genoa and that another uncle, also a brother of her father, has a nervous disease in which blindness is the most prominent symptom.

While it is impossible to draw specific conclusions from only two cases, they are striking illustrations, however, of what we have come to understand as the dementia præcox constitution.

Not including these two cases the following is an analyses of 37 cases of dementia præcox selected from a greater number on file at our clinic. It might be well to state at this point that the diagnosis in all cases comprising the basis of these reports has been made by men who have had considerable psychiatric training. The cases have been supervised by physicians who have put in years in the state hospitals in this state and elsewhere, and the final diagnosis only made after a conference and supervision by Dr. Casamajor.

The average age of these cases is about 26. There are 14 females and 23 males. Of these 37 cases, in only 32 was it possible to obtain any sort of a satisfactory history of the cases before the

actual onset of the trouble. Of these, 18 have the seclusive make-up, which is described as the pre-dementia præcox constitution. These patients before the onset of their trouble were shy, retiring, unusually quiet, would not play with other children, were apt to be day dreamers, and were exceedingly sensitive. Therefore, 54 per cent. of these cases can be considered to have had the peculiar shy, shut-in personality so well described by Hoch.

Eight cases possessed the make-up known as neurasthenoid. These individuals were nervous, irritable, restless, had various somatic complaints, were easily fatigued and were always more or less delicate in health. Five were possessed of distinctly inferior mental characteristics, that is, they were dull, stupid, obstinate, hard to control, and did not get along well in school and were never apt in learning. Two are said to have had a normal make-up before the onset and in these two cases the onset of the psychosis was rather abrupt and the course mild.

The idea that a peculiarly definite make-up in an individual predisposed may lead to the development of dementia præcox, originated in the minds of Jelliffe, Mingazzini and Hoch. Hoch, however, used as his controls in his investigation of the make-up of these cases a corresponding number of cases of manic-depressive insanity and found that this seclusive, shy, shut-in personality did not exist in these cases. It is a peculiar thing that no one has thought to investigate this matter in conditions which are more dissimilar than these two are.

Probably without having this particular subject in mind, L. Pierce Clark has described what he considers to be a potential "epileptic make-up" in children. Quoting from his article in the *Psychiatric Bulletin*, Vol. 2, No. 1, we find that he says that the epileptic child possesses a make-up which is one "of egocentricity, mental poverty, morbid sensitiveness, and an instinctive inability to take on the adaptive social training as does the normal child in the home and school. This defect is shown in the display of rages and tantrums." He also describes a lack of interest existing in these children or rather an interest exists which cannot be sustained in any one direction.

In Vol. 9, No. 1, Clark insists that the epileptic constitution or make-up is invariably present in the pre-epileptic stage, and he describes the two main characteristics of this make-up as being hypersensitiveness and egotism existing in an individual who has a definite lack of power of social adaptation.

In describing Case 1, which is typical of a number of cases cited

by Clark, he speaks of a child who was "self centered—who had a lively temper and was not sociable, preferring to be by herself in her dream world."

In describing Case 2, he speaks of the stage before the development of the epilepsy in which this patient "lost all contact with the world of reality aside from his particular inventive sphere, and had he kept this up continually, exclusively, he probably would not have developed an epilepsy."

In Case 3, Clark speaks of a boy who was "stubborn, took correction badly, could not be driven and was very sensitive." He was selfish, and "he became a day dreamer early and grew up hypersensitive and gloomy like his father."

In Case 4, he describes a man who had "few playmates as a boy, was self bent and preferred to stay at home where he had his own way." When "irritated and annoyed, he took himself to his music room where he played it off on his violin."

These quotations from Clark's work on epilepsy are sufficient to show that he regards the potential epileptic make-up as that existing in the seclusive, hypersensitive child. It would not appear from a careful study of the work of Hoch, Jelliffe and Meyer that their conception of the dementia præcox constitution has developed anything that is peculiar to dementia præcox alone. It would appear that almost identically the same personality exists as a predisposing feature to the development of epilepsy. As a matter of fact the seclusive, peculiar, sensitive child is very common, and a careful perusal of the histories of many patients suffering from anxiety neurosis will show the existence of such a make-up. A good many of the psychasthenics analyzed as a composite picture in this report possessed a similar personality.

There is no doubt that patients suffering from dementia præcox are peculiarly often apt to have a seclusive, hypersensitive, obstinate, associal series of characteristics, but the question is—are these individuals destined absolutely to develop dementia præcox if they develop any mental disease at all, or is the type of reaction called forth in such individuals dependant in a great part on the nature, quality and location of the infection or other organic cause of the disturbance? For instance, is the paretic who, before the onset of his psychosis, an immoral, actively alcoholic, restless, overly social individual going to develop as a result of the syphilitic infection a psychosis in which his own personality will play no part and in which all the mental reactions will be determined by the location of the destruction in the brain and its membranes? Or, on

the other hand, are his mental reactions going to be determined by both these influences, namely, his normal personality modified and exaggerated by the irritative inflammatory and destructive processes which are taking place in various parts of the brain?

It would appear possible to apply the same line of reasoning with dementia præcox and with epilepsy, incidentally. The possessor of the shy, shut-in make-up who has a break in the associative or cortical pathways or who suffers from a pachymeningitis, will probably develop epilepsy under unusual stress, or even under moderate stress. On the other hand, such an individual would probably develop dementia præcox if confronted with the same amount of stress providing there was no physical reason for the development of the epilepsy existing in his central nervous system. Indeed, as a matter of fact, many cases of dementia præcox (as, for instance, one of our cases) have epileptiform seizures, and on the other hand, many cases of epilepsy are accompanied by mental deterioration.

It is, of course, not my purpose to draw any closer analogy than this between epilepsy and dementia præcox, but the point that seems to present itself from this discussion would appear to indicate that it may be possible that we have gone too far in our postulating the individuality and specificity of the seclusive make-up in the production of dementia præcox.

*The onset* was gradual over a long period of time, usually many months in nearly all of our cases.

We have been particularly unsuccessful in obtaining in our family histories any evidence of a profound hereditary influence on the development of dementia præcox in these cases. The discussion on this point would be unprofitable because it has been impossible to satisfactorily investigate all of these cases and the number is not great enough to warrant any deductions.

It is interesting to note that four of these cases developed soon after trauma of some sort. In only three was the trauma to the head and in none was it severe or accompanied by periods of unconsciousness. It probably is correct to assume that the development of the disease in these cases is only indirectly due to the trauma and is an expression of the lack of adaptability which these patients have in a marked degree to any unusual circumstance.

In two cases pregnancy seemed to have the same influence as trauma in acting as a predisposing cause, suggesting the same lack of the power of properly reacting in the usual normal manner to slight physical or mental stress, or even to normal physiological stress such as occurs in pregnancy. The same lesson is probably to be drawn from the cases which developed after various illnesses.

## DEMENTIA PRÆCOX

Age	Sex	Make-up	Onset	Prominent Signs	Assigned Cause	Family History	Diagnosis
21	Male.	Obstinate; stubborn, hard to manage, seclusive. Delicate physically.	Gradual.	Silly, indifferent, attitude impulsiveness, insomnia, delusions of persecution directed against employers. Hears voices calling him only at night.	Overwork.	None.	Paranoid præcox.
20	Female.	Silly, retiring, seclusive.	Worry over her inability to obtain work as stenographer for period of six months.	Talkative, suspicious. Hears the voice of God calling her and other voices. Silly, shy. People are jealous of her ability. Hears the voice of a doctor with whom she is in love and sees his face.	Overwork.	None.	Simple dementia præcox.
25	Male.	Neurasthenic.	Began with inefficiency, indifference and epileptic seizures. Gradual, over four years.	Silly, dull, stupid, indifferent. Masturbates continuously.	Masturbation.	None.	Simple dementia præcox.
29	Male.	Sensitive about personal appearance. Took treatment for some pimples. Worried a great deal about them.	Gradual.	Suspected people were putting powder in his hair, food, etc., to make pimples come out. Accuses employers. Headaches and dizziness. Unsteady worker. Emotional, cries easily. Weakness left side of face. Noises in his head.	Electric treatment for pimples.	None.	Simple dementia præcox.
26	Female.	Seclusive.	Gradual.	Does not get along with the other nurses. Thinks that they interfere and run counter to her. Accuses them of conspiring to ruin her reputation and make her a failure as a nurse.	None.	None.	Paranoid præcox with deterioration.
28	Male.	Quiet, seclusive, queer. Would not play with other children. Stubborn, silly, surly.	Gradual over one year.	Masturbates continuously. Quarrels with boy friends and relatives. People talk about him and he hears them make slurring remarks. Dizzy sensations in the head and stomach. Refuses to move eyes because somebody has fixed them in his head.	None.	None.	Simple dementia præcox.

## DEMENTIA PRÆCOX—Continued

Age	Sex	Make-up	Onset	Prominent Signs	Assigned Cause	Family History	Diagnosis
18	Male.	Shy, timid, basilitul, easily embarrassed. Day-dreams. Seclusive. Did well in school.	Changed positions five times in four years. Began to have difficulty in getting along with people five years ago.	Hears the voices of his employers talking about him and also hears the voice of the devil. Confused, fearful, lies frequently in a boastful way. Many mannerisms lately. Has refused to talk because some one has commanded him to keep quiet. Has heard voices for three years abusing him and calling him vile names. People want to get rid of him.	Father was a prosperous merchant in Russia. Whole family killed. Patient and relatives chased out of country.	None.	Paranoid dementia præcox.
23	Male.	Neurasthenic. Has complained for years of constipation, stomach. Lump in throat. Irritable, sleeps badly, etc.	Gradual over five years.	Somatic delusions, impulsive ideas, confused, purely oriented, etc. Feels that his brain is rotating inside of his head. (Has a fetid rhinitis.) Feels that his stomach and bowels are dying within him. Sleeps on right side instead of left. All insides have fallen to right, can not get them back. Cannot taste anything, food is soft and mushy. Is in an agony of indigestion all the time. Cannot make up his mind to do simple things. Takes hours to dress. No emotion.	None.	None.	Simple dementia præcox.
39	Male.	Timid, seclusive, shy, retiring.	Gradual over six months.		Death of mother.	None.	Katatonica, similar attack seven years ago. Recovery in three weeks.
22	Female.	Always peculiar, queer, impulsive, obstinate, shy.	Three years.	Past two years has been willful. Assumes prayerful attitudes for hours, especially at night. Sees God and hears his voice. He commands her not to move. Sister's children insult her. She hates them. Untidy, careless, talks to herself, tears her clothes. Menaces the family.	None.	None.	Katatonica.



Age	Sex	Make-up	Onset	Prominent Signs	Assigned Cause	Family History	Diagnosis
23	Male.	Neurasthenic, with complaints of stomach, constipation.	Gradual, three months ago.	He is followed by people who wish to injure him. Repeats questions and perseverates. Does automatic, stereotyped things. Cannot make up his mind to undress or to dress. Is exhausted by his attempts to do even little things. Things keep alive in his mind for days that should be decided quickly. Very rigid.	None.	Father bad tempered and irritable.	Katatonnia.
25	Male.	Neurasthenic, quarrelsome.	Pain in neck, easily fatigued, Irritable, depressed, for years.	Fights with best friends, accuses them of attempting to harm him and make his life miserable. Argues indefinitely and quarrels. Mannerisms. People have treated him badly, especially his employers, who seem to be jealous of him, for which reason he has changed places frequently. Slow in movement and thought; uncertain, undecided, confused.	Masturbation.	None.	Paranoid dementia præcox.
24	Male.	Decidedly inferior, always silly, stupid, dull and indifferent.	One year.	Headaches. Indifference. Disorientation. Expectorates frequently, but will give no reason for it. Masturbates openly. Hands tremble. Cannot live with husband. Left him four years after marriage because she would not have children. Began to talk about her induced abortions (3). Sees people with their faces replaced by hats. People change their faces before her eyes. Does many things because she is forced to. Has ideas of being able to build a machine which will silence the world. People are jealous and desire to dull her mind. Silly, indifferent. Incoherent conversation.	None.	None.	Simple dementia præcox.
25	Female.	Seclusive, maladaptability.	Five years.		None.	None.	Simple dementia præcox.

DEMENTIA PRÆCOX—Continued

Age	Sex	Make-up	Onset	Prominent Signs	Assigned Cause	Family History	Diagnosis
23	Male	Neurasthenic.	Several years.	Various pains, aches, dizziness. After last enlistment in the army (3) said food was being poisoned. In Government Hospital for Insane at Washington from November 19, 1915 to March 15, 1916. Discharged, improved. Hears voices of people slurring him. Has an idea various persons have conspired to drive him out of the army. Hears and sees angels. Is resistive, negativistic. Assumes attitudes. Has tremor of the hands. Began to grind teeth, grimaced, refused to speak or eat. Was rigid, held his jaws tight. Mute and inaccessible.	None.	None.	Katatonia.
23	Male.	Normal.	Suddenly, after pulling out of teeth.		Extraction of teeth.	None.	Katatonia.
19	Female.	Neurasthenic. Easily fatigued, nervous, irritable.	Gradual, one month.	Something walking around her forehead. Cries constantly. Feels that she is cause of her sister going insane. Silly, emotional, instability. Lies in bed for days. Untidy. Hears sister's voice calling her.	Admission of sister to Manhattan State Hospital.	One sister, dementia præcox, Manhattan State Hospital.	Simple dementia præcox.
17	Male.	Seclusive, quiet, sensitive. Tantrums.	Five or six years, following fall on head.	Morose and abstracted. Day dreams. Inefficient, impulsive. Feels his head is closed like a lock. Flies into rages, laughs and smiles to himself. Claims he is controlled from inside and has no influence over his thoughts or acts. Beats his brother. Hears voices calling him hard names (C.O. and S.O.B.). Brother is against him. Mother and father conspiring to kill him. Patellars unequal.	None.	Mother an excitable, bad-tempered, emotional woman.	Paranoid dementia præcox.

## DEMENTIA PRÆCOX—Continued

Age	Sex	Make-up	Onset	Prominent Signs	Assigned Cause	Family History	Diagnosis
32	Female.	Inefficient, shallow, dull, stupid.	Two months ago.	Stays in bed for days. Won't work, because "bosses" in various places have attempted to make love to her. Girls get jealous, had to quit. Has so many suitors can not pick one. Wants to be married. Incoherent, rambling conversation.	None.	One brother died of tuberculosis.	Simple dementia præcox.
17	Male.	Dull, seclusive, day dreaming.	Gradual, four years ago after a fall.	Peculiar sensations in chest and stomach. Is being controlled by electricity. Indifferent, dull, hears voices. Assumes attitudes.	None.	None.	Simple dementia præcox.
16	Male.	Said to have been normal.	Gradual, nine months ago.	Hears voices, gets up at night to follow them around. Won't go back to bed. Voices call him bad names and threaten to kill him. Fears to be alone. Dull, stupid, indifferent. Tremor of the hands.	None.	None.	Simple dementia præcox.
17	Male.	Inferior, always dull, stupid, indifferent. Did badly at school.	Gradual, three months.	Found it hard to learn, would not go to school. Day dreams. Hears voices calling his name. Masturbates continuously. Stupid, undecided. Says "I am not sure" to everything.	None.	None.	Simple dementia præcox.
30	Female.	Quiet, seclusive.	Past two years with dullness and indifference.	Somatic complaints. Pains in breast. Insomnia, restless. Brother and brother-in-law are conspiring to ruin her character. People talk about her and deride her in street. They call her a prostitute. Voices say she is going to die. Masturbates continuously. People attempt to do her harm, therefore, she fights against them. Men attempt to seduce her.	None.	None.	Paranoid dementia præcox.

## DEMENTIA PRÆCOX—(Continued)

Age	Sex	Make-up	Onset	Prominent Signs	Assigned Cause	Family History	Diagnosis
15	Male.	Shy, retiring, seclusive. Physically inferior. Mongolian features, misshapen head, nose depressed, misshapen teeth.	Nine months ago with day dreaming.	Makes passes at himself as if hypnotizing self. Reads books on hypnotism. Failed in school, lost efficiency in school rapidly. Assumes prayerful attitudes and hypnotic poses. Refuses to eat, dress or wash himself. Untidy, irritable, menacing. Foul odor from stinking brain. Atrophic rhinitis. Rigid, resistive.	None.	None.	Katatonia.
27	Female.	Inferior, always dull, stupid, but good natured.	Bad memory, indifference, masturbation. Discharged from Wards Island seven years ago.	Headaches, backaches, disorientation indifference, inefficient. Incoherent speech.	None.	None.	Simple dementia præcox.
27	Female.	Neurasthenic, various pains, fatigue, irritability, insomnia.	Four years ago.	Dullness, indifference. Day dreaming. Cannot work because fellow employees and employers are against her, talk about her and make her miserable. Pains and aches all over body.	None.	None.	Simple dementia præcox.
25	Female.	Shy, retiring, quiet, sensitive. Good student.	Sudden with choking sensation in throat.	Roaring both ears. Insomnia. Hallucinations of sensations; feels mucous trickling from nose and throat into her stomach, poisoning her food. Her head is being drawn into her body. Plaster on the back drew her ears together so close that it killed her brain. Left side of the head is dead because doctor made her irrigate ear with cold water. Father and others call her name "Lizzie." Her left side is paralyzed. Father's voice calls to her as if from heaven. People are jealous of her powers. They talk about her to tear down her reputation.	None.	None.	Simple dementia præcox.

## DEMENTIA PRÆCOX—Continued

Age	Sex	Make-up	Onset	Prominent signs	Assigned Cause	Family History	Diagnosis
22	Female.	Quiet, obstinate, dull. Not fond of company.	Following pregnancy.	Walks about the room at night. Will not dress or undress or eat. Says she has not menstruated for two years. Is single yet claims to be pregnant. Men come to her room and violate her. Untidy, dull, indifferent. Will stay in bed for days. Internal Strabismus. Changed positions 12 times in one year. Stole everything he could lay his hands on. Was commanded to steal, could not resist impulse. Is quiet, dull, indifferent. Will not play with others or work. Does house work occasionally. Sees visions of angels. Wanders away by himself for days at a time. Refuses to say where he has been. Silly, laughs in reactions to hallucinations. People say funny things to her. She hears voices calling her by name. Is untidy, indifferent and dull. Fearful, restless, irritable. Masturbates. Dull, indifferent. Would not work. Disorientated. Rambling, silly, incoherent speech.	None.	None.	Katatonía.
19	Male.	Quiet, seclusive, day dreams. Indifferent mentally, but good student until 14.	Gradual with day-dreams.	Internal Strabismus. Changed positions 12 times in one year. Stole everything he could lay his hands on. Was commanded to steal, could not resist impulse. Is quiet, dull, indifferent. Will not play with others or work. Does house work occasionally. Sees visions of angels. Wanders away by himself for days at a time. Refuses to say where he has been. Silly, laughs in reactions to hallucinations. People say funny things to her. She hears voices calling her by name. Is untidy, indifferent and dull. Fearful, restless, irritable. Masturbates. Dull, indifferent. Would not work. Disorientated. Rambling, silly, incoherent speech.	None.	None.	Simple dementia præcox.
19	Female.	Sensitive, emotional, peculiar, seclusive, did not do well at school.	Gradual, two years with forgetfulness, daydreams, crying and spells.	Silly, laughs in reactions to hallucinations. People say funny things to her. She hears voices calling her by name. Is untidy, indifferent and dull. Fearful, restless, irritable. Masturbates. Dull, indifferent. Would not work. Disorientated. Rambling, silly, incoherent speech.	None.	None.	Simple dementia præcox.
22	Male.	Timid, quiet, seclusive.	Gradual, a number of years.	Silly, laughs in reactions to hallucinations. People say funny things to her. She hears voices calling her by name. Is untidy, indifferent and dull. Fearful, restless, irritable. Masturbates. Dull, indifferent. Would not work. Disorientated. Rambling, silly, incoherent speech.	None.	Mother hysterical, three other children very nervous. None.	Simple dementia præcox.
34	Female.	Easily fatigued, irritable, nervous, sensitive, quiet. Would not play with other children.	Gradual, ten years, after death of father, 11 years ago.	Blood rushes to her head. Enemies send people into the streets to mock and jeer her. The church has turned against her. Enemies prevent her from getting a job. Hears voices calling her vile names.	None.	None.	Paranoid dementia præcox.

## DEMENTIA PRÆCOX—Continued

Age	Sex	Make-up	Onset	Prominent Signs	Assigned Cause	Family History	Diagnosis
18	Female.	Nothing known.	Five days ago.	Sees people in cellar. They want to dope her so that they can overpower her. They conspire to do her harm. Incoherent, rambling speech. Disorientated. Silly. Untidy.	None.	None.	Made at Bellevue Hospital, paraneuritic dementia præcox.
18	Male.	Normal.	Two weeks ago after attack of grippe.	Silly, emotional. People have put poison in the soup. Nurse has persecuted him; tried to poison him. Steals; said he is controlled. Impulsive.	None.	None.	Simple dementia præcox.
25	Male.	Indifferent, selfish, irritable, bad tempered.	Many months.	Belches gas. Said he cannot help it. Complains of emissions of semen, since he was 17, after an attack of gonorrhœa. He cannot smell. Wants to be by himself. Peculiar. Uncommunicative, abstracted, indifferent, lost interest. Has day dreams.	None.	None.	Pre-dementia præcox or simple dementia præcox.
28	Female.	Normal.	Sudden, several weeks ago, after slight trauma inflicted on her by husband.	Pregnant seven months. Resistive, quiet. Won't talk, eat or dress. Stays in bed for days. Dull, almost mute.	Pregnancy and trauma.	None.	Katatonía.
37	Male.	Not known.	Not known.	Very much demented. Carries bread, small packages and other things in pockets. Untidy, silly, inaccessible, disorientated, fearful and timid.	None.	None.	Sent to Essex County Hospital.



As an expression of the profound suggestibility which these patients have, it is interesting to know that two of these patients builded various delusions around somatic disturbances. Both of these patients referred to had atrophic rhinitis.

Of the 37 cases, one was not yet considered at the time of diagnosis a fully developed case of dementia præcox, so it is called pre-dementia præcox. Eight were diagnosed as paranoid præcoxes. Twenty were diagnosed as simple dementia præcox, the reaction being of a mildly hebephrenic type or a præcox without trends and without marked delusional or hallucinatory anomalies, and eight were diagnosed katatonia.

## Society Proceedings

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### NEW YORK NEUROLOGICAL SOCIETY

THE THREE HUNDRED AND SIXTY-NINTH REGULAR MEETING,  
JANUARY 7, 1919

The President, DR. FREDERICK TILNEY, in the Chair

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#### CASE OF AREREFLEXIA, ASTEREOGNOSIS AND OTHER SENSORY DEFECTS OF ABIOTROPHIC ORIGIN

Dr. J. L. Joughin presented this case, a young woman, 26 years of age, who was unmarried and by occupation a stenographer. The family history was negative throughout. She first visited the clinic at the Post-Graduate Hospital in May, 1916, complaining of "lack of feeling" in her hands and inability to recognize objects held in them. This condition had existed as long as she could remember. She had anemia at the age of seventeen and no blood test was made. Menstruation had always been normal. As long as she could remember she had always exhibited marked fumbling and clumsiness in handling objects. She had no ability to recognize small objects and very little ability to recognize large objects by palpation. She had always noticed slight, jerky movements of her hands, especially of her fingers, but there was no history of actual tremor or ataxia. She was not always sure of the position of her joints. For many years there had been excessive sweating of her entire body, especially of the extremities, which were always cold. There was no speech disturbances except a slight lisp which had existed for years. Summarizing and giving only the positive findings there were present: (1) Complete areflexia of all tendon and cutaneous reflexes; (2) a definite, though not extreme, loss of tactile sensibility to light pressure; (3) a more marked loss of muscle sensibility, postural sensibility; (4) a still more marked loss of vibratory sensibility; (5) an extreme enlargement of the circles of Weber. This loss of sense of tactile discrimination (Head) was the most marked sensory defect and the asteriognosis was probably due mainly to this; and (6) astereognosis.

The areflexia could be explained by a degeneration (probably partial) of the posterior columns, thus breaking the reflex arc, the mechanism being the same as in locomotor ataxia and Friedreich's disease.

Sensibility was affected principally in its deep modalities and these impulses in all probability passed up the posterior columns to the medulla and so up via the fillet. The only form of cutaneous sensibility markedly affected was that of tactile discrimination, and according to Head these impulses were conducted upward in the posterior columns accompanying the fibers which mediated deep sensibility.

The partial loss of cutaneous sensibility to light pressure (ordinary so-called tactile sensibility) was a little difficult to explain. Many neurologists thought these impulses were conveyed by the posterior columns or by short association fibers in the antero-lateral columns, or by the spino-thalamic tract or by several of these tracts functioning together and substituting for one another. In conditions where the posterior columns were affected, as in locomotor ataxia, cutaneous sensibility to light pressure was often deficient. Consequently, in this patient, while the reason for this loss might be difficult to explain, there was no reason why one should reject the view that there was degeneration of the posterior tracts of developmental or abiotrophic origin.

### NEUROLOGICAL COMPLICATIONS OF INFLUENZA

Dr. I. Abrahamson read this paper. He said the epidemic disease called influenza, which had been scourging the world, and which had been further mystified by the addition of the word Spanish, was still an unknown quantity so far as its essential cause was concerned. On this unknown quantity the speaker could throw no light, though perhaps it might be in itself a service to proclaim one's ignorance. But concerning the polymorphic syndromes which might arise from the nervous system during this mysterious ailment he wished to give a short résumé of his unfortunately very extensive experience. These syndromes might appear early or late: they might complicate or even mask the pulmonary aspect of the disease; they might occasionally appear so wholly detached from all pulmonary signs that the unwary would miss their etiological relationship with the epidemic disease unless synchronously occurring pulmonary cases in the family gave due warning.

These syndromes could not readily be classified. Neuralgias occurred affecting in all degrees of intensity every sensible area of the body. From the fifth cranial nerve, unilaterally or bilaterally, in one or more roots to the second sacral nerve, any nerve might be affected; but the nerves of the face and legs were most commonly implicated. These neuralgias had their source in true neuritides. Indeed, not only did tenderness and pain indicate the neuritic nature of the affection but all grades of herpes zoster might give visible proof of the inflammation to which the nerve was subject.

Motor palsies at all sites and of all degrees and extent might also occur; palsy of the arm and hand muscles of the thigh, leg and foot muscles, unilateral and bilateral, isolated, and general, severe and mild,

transient and persistent. One case of multiple neuritis had been observed in which a lasting bilateral facial palsy was present. Such palsies might arise not merely from inflammation of the peripheral nerves but also from implication of the motor nerve nuclei, especially of the pons and bulb. In only two cases, where nuclei in the cervical cord were attacked, had there been nuclear involvement of the spinal cord. All degrees of meningeal implication might be indicated clinically. Typical cases of encephalitis also occurred.

Among such heterogeneous manifestations it was difficult to distinguish, far less to classify. One might logically assume that during an epidemic, nerve affections occurring in unusual frequency were probably of the same origin as the epidemic. One, therefore, looked with suspicion upon the "lethargic encephalitis," described by Netter, Claude, and Sainton, a clinical picture suddenly revealed in these epidemic days and identified by these observers as a distinct disease entity. One might equally distinguish "acute ophthalmoplegia," "acute epidemic meningitis," or other acute syndromes. Until the contrary was proven all these bizarre and unusual appearances should be regarded as special manifestations or types of the prevailing so-called "Spanish influenza" and not as separate afflictions. Dr. Abrahamson had even now one case which except for the absence of the cherry red spot in the macula presented all the signs of amaurotic idiocy of acute origin; and another of thrombosis of the superior nasal branch of the central vein of the left eye, along with possible thrombosis of the brain sinuses.

Common to all these cases was their occurrence during the epidemic areas. Examination showed that almost invariably there was complete absence of the usual signs in the cerebrospinal fluid, which characterized what was formerly regarded as influenza (Pfeiffer bacillary influenza) implications of the central nervous system. On the contrary, in the prevailing epidemic, the cerebrospinal fluid was increased in amount, and the mononuclear cells were increased perhaps even as high as 100. The fluid so far as at present determined was sterile. In one case the fluid reduced Fehling's solution; in another there was no reduction. The amount and character of the fluid and the number of the cells varied somewhat according as the meninges, or nerve cells of the nervous system bore the brunt of the attack. In a subsequent article these several matters would be more fully considered and the clinical with the pathological manifestations of this disease would be correlated. This was merely a brief preliminary report of a few of the more interesting neurological cases seen in this mysterious and protean malady.

Dr. M. Allen Starr expressed his interest in these cases of marked neurological symptoms following influenza. They certainly showed that there was no part of the nervous system or its coverings which was exempt from attack by the agent responsible for the epidemic. He remembered very well eighteen or twenty years ago at the time of the first great epidemic of influenza in this country that subsequently to its

development a number of articles were written on the nervous complications of influenza. He recalled particularly that Dr. James J. Putnam came from Boston to read before the Neurological Society a very interesting paper regarding neurological conditions developing subsequent to the grippe, and he thought that if Dr. Abrahamson looked over the literature of that time he would find a number of cases corresponding closely to those which he had described this evening. He distinctly recollected cases described as secondary meningitis and those corresponding to anterior poliomyelitis and anterior encephalitis, multiple neuritis and single type neuritis that followed influenza. He therefore considered that there was reason to believe the cases reported by Dr. Abrahamson were post-influenza cases, and that it was the part of wisdom for him to have called attention at this time to the frequency with which nervous complications followed the grippe.

Dr. William M. Leszynsky said that he had seen a few cases of the kind mentioned by Dr. Abrahamson and he also recalled the type of cases referred to by Dr. Starr. He had seen a number of patients also in whom mental symptoms developed following the subsidence of active infection. In one case that impressed him very much the patient had been getting along very well after influenza and pneumonia and temperature had been normal for one week when it suddenly shot up and the patient became maniacal. She continued in this state for two or three days, the end of the third day, however, finding her sleeping well, taking food and rational. She was in such good condition that ultimate recovery was hoped for, but she died suddenly during the night. Another similar case had ended fatally. Dr. Leszynsky said he had seen a number of psychoneuroses following the grippe and it was a question whether these were a result of the disease or whether the influenza was only the exciting cause in a predisposed patient. At the Manhattan State Hospital they had recently admitted about fifty patients with a history of influenza preceding the psychosis, nearly all being of the manic depressive type. There was nothing distinctive in the symptomatology which would lead one to make the diagnosis of a post-influenzal type without the previous history. From the viewpoint of the speaker, there was nothing in the character of the neurological manifestations to make one consider them different from those seen in the epidemic of some years ago.

Major George H. Kirby, M.C., chief of the neuropsychiatric service U. S. Army Hospital No. 1, said that his experience had been chiefly with soldiers presenting either psychotic or functional nervous symptoms subsequent to influenza, alone or complicated by pneumonia. The clinical pictures met with had covered an extremely wide range and had furnished no positive evidence that influenza produced a special or characteristic form of mental disturbance. From the psychiatric standpoint the most common reaction to influenza was a post-infection, or post-febrile, state of neurotic fatigue, vasomotor instability, feeling of mental

inadequacy, and depression. Probably these symptoms, in some degree at least, followed practically every case of influenza, but in a majority of cases they disappeared promptly, being regarded as hardly anything more than a manifestation of a general debility, although they were very often indeed out of all proportion to the brief duration of the influenza and were unaccompanied by any marked general physical reduction. In other cases the fatigue and inadequacy symptoms persisted over a long period. Major Kirby felt that very little was known about the clinical position of these states relative to fatigue syndromes due to other causes or to the so-called psychoneurotic types of neurasthenia.

The deliria (infective-exhaustive psychoses) formed the second most common type of mental disturbance complicating influenza. Particularly frequent during the period when the sensorium was clouded or just after the patient emerged from the delirium, were stuporous and various catatonic-like manifestations which unfortunately were often mistaken for dementia præcox. Among the constitutional psychoses, manic-depressive insanity, particularly the depressed phase, most frequently appeared during or soon after influenza. Dementia præcox rarely developed in connection with influenza unless schizophrenic traits had been previously in evidence. A few cases of paresis had been observed in which it seemed probable that influenza was responsible for initiating the first psychotic manifestations of the disease. In this connection Dr. Abrahamson's observations on the spinal fluid were suggestive. Major Kirby stated that in none of his cases in which syphilis of the nervous system could be ruled out was there any increase of the cellular content of the spinal fluid. He did not doubt, however, that a non-syphilitic meningeal reaction might occur as a complication in some cases of influenza. He hoped that reports on the pathological findings of the central nervous system of cases such as Dr. Abrahamson had observed would soon be made available.

Dr. Walter Timme said that he had seen few meningitic forms of post-influenzal infection, but he had seen cases of bilateral facial involvement which he believed to be rather rare. The number of cases seen in these post-influenza conditions was noteworthy. In Plattsburg there were three men who had had influenza abroad and had recovered. After reaching camp they became similarly affected, first one side of the face becoming involved and then the other side within a week. Another case which seemed to be due to influenza was that of a girl of nine or ten years of age in whom the symptomatology was that of poliomyelitis except that instead of depressed reflexes there were exaggerated reflexes, due to cortical cell involvement, polioencephalitis of the Strümpell-Lichtheim type. The cell count was 60 or 70 and there were also mononuclears. It seemed to Dr. Timme that these post-influenza cases were so widely divergent that they should be considered as complications of influenza rather than as specific syndromes.

Dr. H. Climenko said that there was not much to add but there was



an observation that he had made, probably synchronously with many others of those present, and it was this: The epidemic seemed to have been unique in that it transferred potential neurological and psychological tendencies into dynamic conditions. He saw a case in Brooklyn that demonstrated this. The man was said to be suffering from a psychosis following influenza, but Dr. Climenko found the case to be an outspoken one of general paresis. The wife, who was also suffering from influenza, admitted a number of miscarriages and said that her husband had been treated for syphilis. He had been attending actively to business before the attack of influenza and developed all the acute symptoms of general paresis within a few days. Another observation the speaker had made was that the severity of the influenza was not always in proportion to the severity of the subsequent neurological symptoms. One patient gave a history of having been sick only one day, but his pupils reacted only slightly to light and one could readily admit the possibility of a diagnosis of multiple lesions of the brain. Both fluid and blood were negative. There was every reason to believe that these cases of psychoneurosis were coming in daily to clinics as well as private offices with symptoms dating back to the epidemic and it was well to be able to recognize them.

Dr. Frederick Tilney described two cases that he had seen in the past two weeks, one suddenly developing paralysis agitans, first manifested in the right hand, then extending to the right leg and now showing a typical Parkinson syndrome. The other case, a mild paretic, had suffered from influenza for a week and then the temperature came down, but that night he jumped out of a window. This was unmistakably a fulminating case under the stimulus of added infection. It was very evident that latent processes might be brought out by this influenza.

Dr. Abrahamson, in closing said that subsequent to the epidemic of 1889 the discovery of Pfeiffer's bacillus had occurred and since then these microorganisms had been found in all true cases of influenza. To call these other cases influenzal without bacillary evidence was to deny the value of the finding of the bacillus. No mention had been made in this paper of mental or functional disturbances or involvement of the ductless glands as this communication had been intentionally kept within the limits of certain neurological conditions, but there was no doubt that there had been a whole series of these conditions following influenza, particularly involvement of the vasomotor system. Dr. Abrahamson had refrained from labelling his cases influenzal because up to date he had not been able to prove they were such.

#### THE MECHANISM OF PAIN FROM THE PHYSIOLOGICAL STANDPOINT

Dr. Joseph Byrne delivered this address in which he outlined an entirely new theory based on clinico-pathological studies embracing

lesions of the nervous system at various levels from the periphery to the cerebral cortex. Pain had been aptly described by Sherrington as the psychic equivalent of the nociceptive reflex. Dr. Byrne regarded the afferent nociceptive arcs as the forerunners of the plain paths leading to the optic thalamus from which indeed these latter were to be considered as developed. All forms of sensibility might ultimately be reduced to two primary forms, viz., (1) affective, and (2) critical. Affective sensibility was that through which one became aware of pain, pleasure or change of state. Critical sensibility on the other hand implied comparison. The impulses mediating the fundamental gross affective element (pain or hurt) entered into consciousness mainly in the optic thalamus, whereas the impulses mediating the critical sensibility entered into consciousness mainly at a higher level, presumably in the cerebral cortex. The speaker rejected Head's division of sensibility in the peripheral system of nerves into epicritic, protopathic and deep, and offered his own classification as follows: (1) superficial critical sensibility, (2) superficial affective, (3) deep critical, and (4) deep affective. This classification was simpler than Head's or Sherrington's (exteroceptive proprioceptive and enteroceptive) and more in accord with the needs of clinical neurology. Superficial critical sensibility was evoked by such stimuli as light touch, degrees of heat and cold ranging about the neutral point or skin temperature, and compass-points simultaneously but lightly applied. Superficial affective sensibility was evoked by such stimuli as pinprick under moderate pressure, cold ranging from 22° C. to 0° C. and heat ranging from 40° C. to 55° C. Deep critical sensibility embraced pressure-touch and its localization, posture and passive movement, size, shape, weight (passive), the compass-points simultaneously applied with firm pressure, etc. Deep affective sensibility embraced pressure-pain, and heat and cold in extreme degrees, e. g., 0° C. to 55° C.; in massive prolonged application. In brief, then, the theory of the mechanism of pain was as follows: In normal sensibility the critical system controlled the affective system of neurones in such a way that the anabolic and catabolic processes in the affective neurones were nicely adjusted to the needs of circumstances by supplying suitable threshold, etc. The materials requisite for the initiation and conduction of nerve impulses (kinetoplasm, etc.) were supplied in such a manner and to such an extent as to meet in the best manner possible the requisite needs of normal sensibility. Lesions causing dissociation of sensibility, such as that found in lesions of the peripheral nerves, in the medulla spinalis, in the brain stem or in the thalamus, upset these nicely adjusted mechanisms by interfering with the control normally exerted by the critical system upon the affective system. The immediate effect of such lesions was the appearance of pathological tenderness and hyperalgesia. In all such lesions the affective neurones themselves were directly implicated anatomically or functionally. This interference acted as a stimulus inciting the remaining portions of the

affective neurones and especially the neurone bodies in the dorsal root ganglia to hypermetabolism in the interests of restoration of functional and anatomical continuity. One of the by-results of such hypermetabolism was the spontaneous or readily elicited overflow of neural energy (nerve impulses) brainwards. This was the cardinal feature of pathological tenderness and spontaneous pains. These two principles underlay the theory of the mechanism of pathological pain and tenderness, viz., (1) dissociation, functional or anatomical, of the critical from the affective system of neurones, and (2) hypermetabolism of the injured or liberated affective neurones. The pain and tenderness in themselves represented a regressive type of sensibility serving a purpose similar to that of such primitive protective mechanisms as the nociceptive reflex.

Dr. Frederick Tilney said that he had thought a great deal of this theory of Dr. Byrne, but he felt that all were still in the realm of speculation in spite of the distance to which this theory had carried them. Over and above the findings of Head and his disciples, Dr. Byrne in the first place had brought forward a broader conception of the somatic sensibility as a whole in that he recognized very clearly that there were two distinct types of somatic sensory elements, the affective and the discriminative. Of course, in their phylogenetic and biological bearing they were very different in the purposes they served. The affective was presumably an extremely primitive type of sensibility. That had clearly led Head to his term of "protopathic." It was undoubtedly a part of a defense element, and the speaker agreed with Dr. Byrne in his limitation of it to the hurt element. It was in the defense sensibility that the muscles, joints and bones had their qualities of peripheral sensibility.

The second point was the recognition of the critical sensibility which prevailed in the various qualities of somesthetic features. That served a different purpose. That was not intended for a defense mechanism like the nociceptive reflex, but served the purpose of a cognitive method of protection, maintained in a process or combination of processes in the cerebral cortex which one made use of in adapting various types of sensation to various skilled purposes. The recognition, then, of these two types of sensibility was a distinct advance. Ranson had proved that there were two sets of fibers, one of them of unmyelinated or scantily myelinated fibers and these probably mediated the pure affective elements.

Coming to the question of the thalamus, Dr. Tilney was not clear in his mind that one was not far over his head in the determination of this unusual relation of two axonal processes. He felt that the theory at this juncture, however, offered a stimulus and an interesting outlook, but it was far from conclusive. There was a tremendous amount of work to be done before one could come to a definite conclusion. He believed, in the main, that all were greatly indebted to Dr. Byrne for

going forward as far as he had with his idea. It stood as an illustration of what a long, long trail lay here, but it would stimulate others eventually to reach its end.

Dr. Walter Timme considered that there were certain features of Dr. Byrne's theory that he would like to comment on. A few years ago he was interested in the cutaneous phases of the sensory disturbances and, as these investigations in their final analysis depended upon experimental methods of testing sensation, he turned his attention to these methods of examining for sensation especially regarding the specificity of the power of nerves for carrying certain affective stimuli. In the first place, regarding the experimental modes of obtaining these reactions, he had yet to see a sensation of heat evoked clinically by any other means than pressure against the skin by a test tube containing hot water, or by other physical means. This brought two elements into the picture, pressure and heat. Heat was always accentuated if combined with pressure. The only true method was by radiation of heat without touching the skin and by this one would obtain a different response on the part of the patient. This might be done with a lens refracting the light of the sun or of an arc light. If heat through this means was sharply and suddenly applied and then taken away the patient would not be able to distinguish between heat and a pinprick. Both produced pain. Specificity of conduction in this instance was therefore absent. Again, if one changed the focus of such a lens and allowed only the central portion to carry the heat to the surface, one would get a different effect from an experiment in which all the radiation was allowed to fall on the skin. One would get pain, and with an increased amount of heat in the second instance one might get no pain. Why was this? For the reason that there was no sudden change from one state to the other. If one put his arm in hot water he did not feel the heat throughout the arm; he felt the heat only at the level of the water. The same with cold. The same with pressure as seen with mercury. Dr. Timme explained that he meant by this that one did not distinguish heat, or cold, or pressure, or touch, or pain as such, but only distinguished differences in these qualities; and it was the differences which produced in the end organs in circumscribed areas these changes of sensation. No nerve or series of nerves could conduct a difference, and if one changed the degree of such a difference, reducing it from sudden to gradual, all pain would cease. Consequently, the same amount of pressure, or light, or heat, or cold might be applied to exactly the same end organ as when pain was produced; and if done slowly no pain would be produced. This did not alter the value of Dr. Byrne's theory that at several levels from the posterior spinal ganglia upwards to and beyond the thalamus these differences might be made the starting point of effective impulses, purposeful protective activity, probably through a marked difference of potential in the nerve current of adjacent ganglion cells.

Dr. Byrne, in closing the discussion, reminded Dr. Tilney that his

conception of the relation of the critical and affective paths within the thalamus was so far based merely upon physiological studies. He regretted that time did not permit him to enter fully into proofs upon which this relation was founded, but he felt quite certain that such a relationship was fully justified by the facts. He had studied no less than ten cases of thalamic syndrome each showing that identical dissociation upon which he had based his subdivision of the peripheral sensory nerves into four sets or systems, viz., *superficial critical, superficial affective, deep critical and deep affective*. Thanks to the labors of Dejerine, Egger, Roussy and their colleagues, as well as of Head and Holmes, the picture of a thalamic syndrome, more especially upon the sensory side, was a very clean cut entity. Dr. Byrne regretted that he had had no opportunity to make postmortem observations upon any of the thalamic cases he had studied in life. The nearest he got to such a consummation was at an operation performed on one of his cases by Dr. Alfred S. Taylor. In this case, which exhibited typical thalamic dissociation phenomena, a blood clot and a collection of serum were found in the internal capsule about the level of the thalamus. Undoubtedly, the lesion had involved the thalamus in its ventrolateral aspect. Since Dejerine and Eggers called attention to the thalamic syndrome early in the present century, only about twenty autopsies had been reported in the literature. The picture presented by the cases of thalamic syndrome included in Dr. Byrne's studies had been so clean-cut that it was almost impossible to mistake it for anything else.

Regarding Dr. Timme's remarks on the sensory tests, Dr. Byrne thought that most of these referred really to the critical elements of sensitivity rather than to the fundamental affective elements which include merely "hurt," "pleasure" or "change of state" without further qualification. The very essence of all stimulation of necessity implied a difference or alteration of conditions at the point stimulated. The statement that pinprick sensation was felt upon the application of heat through a lens in one instance, and was absent when the position of the lens was altered, recalled observations made long ago in testing with pinprick, viz., that pain was felt at first, then there was a period in which pain was not felt though the stimulation was continued and later on pain of a distinctly different type appeared. It should be remembered that heat, and by this was meant temperatures above 45° C., was an adequate stimulus for pain. Indeed, recent work in the modern psychologic laboratories had corrected neurologists in this respect with good reason, for heat in the true sense of the word was not the equivalent of warmth. Heat was really a perceptual fusion complex derived from stimulation of pain points plus paradoxical stimulation of cold spots. This could often be demonstrated by testing the skin of the forehead at the junction of the hair, where, if a warm stimulus were applied, not only could warmth be detected but cold also surrounding or within the area of warmth. It was a fact that as tests were ordinarily made

every kind of stimulus made appeal to several different types of receptor mechanisms. Thus, pinprick implied pressure as well as hurt, and it also implied an additional critical element, viz., sharpness which was perhaps more nearly related to pressure sensitivity than it was to pain. Both heat and cold also involved contact and pressure and for that reason in making tests patients should be drilled to reply in order to the three different elements, "touch, hurt, heat," etc., accordingly as each of these was perceived. Another point about these tests was that one's education in so far as it was derived from sensory impressions was dependent not so much on refined forms of stimulus akin to those employed in psychological and neurological studies, as upon grosser, more extensive forms incidental to the individual's daily contact with his environment. In some of the lesions of the central nervous system, as for instance in a case of syringomyelia studied by the speaker, the findings were such as to confute a good deal of what had been accepted by modern psychologists as orthodox regarding the four modalities, viz., pressure (touch), pain, heat and cold. The only differentiation between the various paths in the peripheral nerves which so far could be regarded as safely established, was that between the pathways mediating the fundamental affective elements (hurt, etc.) and the pathways mediating the critical or discriminative elements. These latter (the critical system) might or might not be capable of being further subdivided into separate systems served by separate end organs for mediating separate modalities, but it was only the fundamental *affective system*, mediating the "hurt," etc., elements as such, which so far have been established as separate and distinct from all other afferent paths subserving sensation and which in combination represent the *critical system*.

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## CHICAGO NEUROLOGICAL SOCIETY

REGULAR MONTHLY MEETING, DECEMBER 19, 1918

DR. H. C. STEVENS, Vice-President, in the Chair

### BRACHIAL PLEXUS LESIONS. TWO CASES

DR. S. KRUMHOLZ first presented a laborer 21 years of age who fell 50 feet from a scaffolding. He was unconscious five hours and in addition to severe contusions had a persisting paralysis of the right arm. There were marked pain in the region of the thumb and index finger of the affected arm. Examination failed to develop any cranial nerve or cortical lesion. There was a complete flaccid palsy of the arm with some slight power still present in the fingers. The serratus was intact. There was loss of the biceps and triceps tendon reflexes and marked sensory



loss to touch over the distribution of the radial side of the arm, forearm and radial side of the index finger. There was no sympathetic paralysis and there were no Klumpke phenomena.

The second patient, a male, 34 years of age was thrown from the running board of an automobile. He was knocked unconscious remaining comatose for about nine hours. He was then noted to have a complete flaccid palsy of the left arm which had persisted six months at the time of presentation. Within the first month neuralgic pains appeared in the paralyzed arm. Clinical examination showed loss of motion of the hand and wrist. There was diminished abduction, but raising the shoulders was nearly normal. There was atrophy as was also apparent in the first patient. All of the deep reflexes were gone. The serratus was apparently uninvolved. The arm was anesthetic save for an area over the inner aspect of the arm upper 2/3. Corresponding however to no well marked radicular distribution. Dr. Krumholz then discussed the localization diagnosis following Frazier's criteria of intravertebral, intervertebral and extravertebral. In both cases the lesions were extravertebral and above the bifurcation of the serratus and rhomboideus innervations. Operation was indicated in both patients.

*Discussion.*—DR. G. W. HALL called attention to the fact that in the first patient the affected shoulder was held higher than that of the normal side.

Dr. Krumholz said that the surgical findings in the first patient were of a lesion in the lower part of the plexus. In the second patient the scar tissue was marked and there was a possibility that there was an intervertebral lesion of the lower cervical roots. The persistent pains were interpreted as possibly due to root involvement and that section of the roots might ultimately be necessary or advisable to correct the pains.

### CEREBELLAR TUMOR

DR. G. W. HALL presented a man 30 years of age with negative syphilitic history. The beginning symptoms were dizziness, impaired sight, disturbed speech and weakness in walking. His first symptoms were headache which had preceded the development of a sudden visional trouble two weeks preceding. This vision difficulty first appeared as a temporary affair lasting only a few minutes. A second attack of visual difficulty occurred within the next hour and had persisted. A more or less generalized weakness then developed so that the patient could hardly feed himself.

Clinical investigation showed a marked coarse bilateral nystagmus increased on looking to the right. The vision was 6/200 D and 5/200 S. There was no choked disc though both retinae were pale. The speech was slurred and slightly indistinct. The reflexes were active, but there were no pathological alterations. There was slight ataxia of the upper extremities more marked on the right side. Objects seemed to revolve

to the left. The gait was slightly reeling with a tendency to fall backwards. There was no marked impairment of the muscle sense.

These findings seemed to indicate a cerebellar lesion probably in the vermis and rather more to the right than the left. A hemorrhage occurring around a growth of a gliomatous nature might account for the sudden onset of the symptoms. Such patients in whom a necropsy reveals evidence of hemorrhage sometimes manifest slight paralysis which clears up. Choked disc however was absent, but this sometimes occurred with such growth. Both blood and spinal fluid Wassermann tests were negative and the intraspinal pressure was normal. Gordon and Oppenheim reflexes were absent.

### TRANSVERSE MYELITIS SHOWING BEEVOR'S SIGN

DR. HALL also showed a man with a syphilitic transverse myelitis in the twelfth dorsal region manifesting distinctly Beevor's sign.

*Discussion.*—DR. P. BASSOE suggested that the optic disturbance with the pale disks might be due to an earlier higher pressure which might have been caused by a tumor of the fourth ventricle rather than of the cerebellum proper. The increase in cells and globulin would point to this.

### PROGRESSIVE MUSCULAR ATROPHY

DR. HALL had made a diagnosis of progressive central muscular atrophy in the case of a teamster in whom marked fibrillary twitchings without sensory disturbances were present in the muscles of the back and upper extremities. These had appeared gradually, first in the right arm and then extending into the left arm and back. The shoulder muscles and those of the hands were atrophied and those of the shoulders were weakened. Babinski reflex was absent. The lower extremities showed no stiffness or spasticity. There was no history of syphilis.

### AMYOTROPHIC LATERAL SCLEROSIS

In this patient Dr. Hall reported a marked spasticity with a pronounced Babinski reflex, which the spasticity however obscured from demonstration. Oppenheim's sign was absent as were also sensory disturbances. The atrophy and fibrillary twitchings of the upper extremities were present as in the former case. This case was classified as a different type of the same disease as of former, the spasticity of the lower extremities showing involvement of the lateral column of the cord as well as of the anterior cells. The syphilitic history was negative here also.

### SYRINGOMYELIA

A third case presented by Dr. Hall to illustrate various forms which atrophy might take showed atrophy of the tongue with fibrillary twitch-

ings of the right side only. There were also sensory disturbances the pain sense being more marked on the right than on the left side. The sensory disturbance extended to the region of the fifth nerve on the opposite side from the atrophy. Another case showed pyramidal tract involvement and another a more central involvement of the pain and temperature fibers at their decussation. Treatment could not effect much with such cases. Any toxic origin should of course be removed.

*Discussion.*—DR. BASSOE suggested that Roentgen-ray treatment might at least check the overgrowth of glia and gliomatous formation with caries formation, which caused the symptoms in syringomyelia. Dr. Hall believed that central nervous changes producing such symptoms as well as multiple sclerosis could arise from focal infection of some sort. Syphilis was sometimes proved to be the cause even though the Wassermann test had proved negative and there was no positive history of syphilis.

DR. H. C. STEVENS thought that the atrophy of the tongue was due to the incessant action of the muscle due to the fibrillary contraction rather than to the trophic influence of the nerve on the muscle. He had been interested in experimenting with the injection of calcium, barium and magnesium salts for muscular atrophy.

## Collected Abstract

### SOME RECENT STUDIES ON BERI-BERI AND RELATED TYPES OF POLYNEURITIS. WITH PRELIMINARY REMARKS ON PHOSPHORUS FUNCTION IN THE DYNAMICS OF BIOCHEMICAL MECHANISMS

A COLLECTED ABSTRACT.

BY SMITH ELY JELLIFFE, M.D., PH.D.

The great admixture of racial types which has been brought about in the European battlefields of the past four years has served to call renewed attention to many diverse forms of tropical disturbances which by reason of their usual rarity are passed over unnoticed. This is particularly true for that type of polyneuritis which has been termed beri-beri and during recent years a great many studies have been made upon this nerve disorder.

Its topographical spread has been made the subject of a number of studies. Thus Fraga has written of the disease in Brazil, Holst in Norway and on the Norwegian vessels, Vinson has described an epidemic on board a Cuban vessel, Martinez speaks of the disease occurring in Spain, Shim reports its presence in Corea and Leporini describes a rare affection from African sources related to beri-beri. Indochinese troops in Marseilles afford Sicard an opportunity to study it, Barbe describes its occurrence in Sidi Abdallah and Wydooghe describes an epidemic in the valley of the Lukuga in Africa.

Not only have a number of topographical studies been published but records of the clinical features, the pathological alterations and the etiological hypotheses have been published. The present communication aims solely at collecting some of this material and offering critical comment from time to time concerning some of the more striking features.

Fraga's<sup>1</sup> contribution says that epidemic polyneuritis has been reported frequently in Brazil, but usually under another name, and also other disorders have been termed beri-beri. The so-called galloping beri-beri of the Amazon valley which has always had a certain amount of superstitious dread connected with it is a malignant type of malaria. In the asylums and the prisons of Brazil beri-beri is not at all infrequent and is very fatal. The author reports 30 deaths in Bahia in 1914, 15 in

<sup>1</sup> New Orleans Med. and Surg. Jl., Jan., 1918.

1915 and 26 in 1916. Rio seems to be free of the disease, but in Minas epidemic cases are reported as well as in San Paulo. Ship cases are on the decrease, though the war activities have brought into service some of the older vessels and there has been a slight recrudescence of the disease.

Martinez<sup>2</sup> reports a case of beri-beri in a fisherman. At first it seemed like a case of polyneuritis, but the diagnosis of beri-beri was established through the heart symptoms, cachexia and absence of malaria, alcoholic or syphilitic involvement. Moreover recovery was gradually induced through a nourishing diet other than that on which the patient had been living, particularly with avoidance of fish, rice and potatoes. Rest and massage were also employed.

In Vinson's<sup>3</sup> report the epidemic occurred in a ship sailing from Rangoon to Cuba. Mauritius was reached after 90 days with difficulty as all the crew were affected by the disease, which caused four deaths. The Swedes were the first on board to be affected after being two months at sea. Rangoon rice was the staple article of diet.

Mauriac and Duclos<sup>4</sup> describe an epidemic occurring among negro soldiers in the south of France. Most of them were from Senegal. The epidemic was considered as an abortive type of beri-beri and presented edema, mostly pretibial, with fever, cardiac disturbances and albuminuria. There was a marked eosinophilia and a mononucleosis. There was no polyneuritis and yet the diagnosis seemed most satisfactory as classing them as a "forme fruste."

Sicard, Roger and Rimbaud,<sup>5</sup> from a large experience at Marseilles, give an account of the beri-beri seen among the Orientals who have been imported for war purposes. They follow the old classification of "wet," "dry," and "mixed" varieties, noting other occasional forms, as cardio-pulmonary, chronic and relapsing, slight and indefinite. Of 228 cases treated at the hospital Frisul, 45 of the wet type, 13 died, or 5.8 per cent. Marked congestions and hemorrhages were noticed in the stomach and intestines and the degeneration of the sheath of Schwann of the large nerves was marked, but there was no interstitial neuritis. The disease was almost confined to the Indo-Chinese; in the African natives it was very rare. Most of the cases developed the disease before disembarkation or within a few days after, and generally the more unsatisfactory the conditions on board, the greater the number of cases. In no case could any spread of infection from the sick to the healthy on shore be traced, and there appears little possibility of these imported laborers spreading the disease among the indigenous population.

For prevention, the importance of providing good hygienic condi-

<sup>2</sup> Martinez, F. F., Beri-beri in Spain, *Med. Hera.*, Mar. 7, 1918.

<sup>3</sup> Vinson, L., Epidémie de bérubéri à bord d'un navire, *Bull. Soc. Méd. de l'île Maurice*, 1917, May-Dec.

<sup>4</sup> Paris *Med.*, June 15, 1918.

<sup>5</sup> Sicard, J. A., Roger, H., and Rimbaud, L., Le Bérubéri des Indo-Chinois à Marseille, *Paris Méd.*, 1917. Dec. 1.

tions and a dietary containing beans is insisted on. In discussing the etiology the authors say "it is perhaps premature to conclude that the polyneuritis of birds and human beri-beri is identical," as among their cases they never noticed the cerebellar symptoms common in affected fowls, neither was the cure as rapidly brought about by change of diet.

Wydooghe<sup>6</sup> describes a circumscribed epidemic occurring in the African valley of Lukuga. It had a mortality of 27 per cent. It started in 1913 and has remained partly epidemic as far as Lake Tanganyika, varying seasonally. The chief periods of epidemic exacerbation were in the months of November and May or during the wet season. In the hot-dry months the cases were much less numerous and severe. The author shows that certain areas or centers of infection appear to exist, and he is strongly in favor of the theory that this local infection persists and that the germ is possibly conveyed by some insect agent. He finds no support for the rice theory, as the disease was localized and periodic among groups where the same food, rice, maize, manioc, etc., were used generally; also alteration in diet in these centers did not cut short the epidemics. He points out the curious fact that women were rarely affected, possibly because they seldom remained long in the epidemic areas, and were under more favorable conditions. He gives instances of outbreaks occurring from camping on old grounds which had been previously marked beri-beri centers. No epidemic ever originated at the hospitals of Niemba in spite of numerous cases treated there. He thinks that the infectious germ is only present in the blood for a short period, so that the propagation of the disease is difficult outside the epidemic centers, and where the "carrier" is also probably absent. For treatment he obtained the best results with intravenous injections of sublimate 1-2 c.c. of 1 in 100 solution acting as a germicide, given for 7-8 days consecutively. This brings about a rapid cure, cases returning to work after a week, and few relapses occurring. The  $\text{HgCl}_2$  introduced into the circulating blood becomes transformed into a double chloroxydalbminate of mercury and sodium. The disease was probably introduced from the East by coolie laborers in 1913.

Abdon<sup>7</sup> reports an observation of beri-beri in the sailors on a schooner from British West Africa, one of whom died the day after landing, from the acute pernicious dry form of the disease. Of the original crew of ten men only eight remained, all except the skipper suffering from beri-beri. Three of the patients had the wet or edematous form of beri-beri, and complained of pain in the abdominal, epigastric, thoracic and lumbar regions, and general lassitude. The other three suffered from the dry form with similar symptoms, also muscular atrophy, slowed up reflexes, and one had, as a complication, scurvy, and another dermatitis enfoliativa. Careful treatment brought the survivors out of their trouble in thirty days. The food on the voyage consisted largely of rice,

<sup>6</sup> Bull. Soc. Path. Exot., March, 1918.

<sup>7</sup> Abdou, N. T., Beri-beri, J. A. M. A., Oct. 19, 1918.



curry and salt meat for all except the captain, who had a much more liberal diet which he selfishly consumed. During treatment they were fed on fresh fruit and vegetables, milk and fresh meat.

Observations made by Barbe<sup>8</sup> in the summer of 1916 at the hospital of Sidi-Abdallah on 277 sick Anamites, of which 251 were case of beri-beri are here reported. Ten were of the edematous, 191 of the dry, and 50 of the mixed form; 80 were classed as severe, 40 as mild, and 131 slight. There were seven deaths. In the dry cases the author noted the power of walking, running, and squatting, and gives relative figures, week by week, by which he was able quickly to summarize the course of each case.

Enlargement of the scrotum was found in three cases. The sciatic and the crural nerves were the chief neuritic complications in the lower limbs and the radial in the arms. Segmental myelitis types are also reported on. These probably are due to ascending neuritides and many peripheral nerves are involved, including the pneumogastric. Drugs were of little avail in the treatment, the chief reliance being placed on the diet. The outbreak of the disease on the transport was due to the overcrowding as the passage was over three months in duration and there were many annoying climatic changes which reacted on the morale of the soldiers. A purely dietary hypothesis was not satisfactory to this author, who is inclined to attribute the polyneuritis to an intoxication derived from the food which in addition to defective hygienic surroundings favored a microbic infection possibly involving the duodenal passages. In a number of his fatal cases he found a severe duodenitis, an observation which coincides with the opinion of Hamilton Wright who has maintained the disorder to be due to a bacillus toxemia having its chief habitat in the duodenum.

Shim<sup>9</sup> reports on 70 cases of beri-beri who were admitted to the hospital wards at Seoul. They were all mental patients in which the polyneuritic complications were present. Twenty-eight of them died. Koreans were less resistant than the Japanese three to one. They were also in worse physical condition than the Japanese. The beri-beri developed in all of the cases after their admission to the hospital. It was held that the disorder was due to the inability of the patients to take their food and medicines regularly because of their mental condition. Dementing and epileptic states were the most frequently observed of the mental phenomena.

Holst<sup>10</sup> traces the history of beri-beri and the preventive measures used in Norwegian ships. The suggestion that the disease is due to infection must be dropped, he thinks. In 1900, of 190 English ships

<sup>8</sup> Barbe, *Considérations sur le bérubéri observé en 1916 à l'hôpital de Sidi-Abdallah*, Arch. Méd. et Pharm. Nav., 1918, June.

<sup>9</sup> Korea Med. J., Aug., 1917.

<sup>10</sup> Holst, Axel, *Beriberi and its Cause in Norwegian Ships*, Cent. f. Bakt. 1. Abt. Orig., 1918, Mar. 27.

arriving at Falmouth from harbors south of 33° N., 1 or 0.5 per cent., and of 97 Norwegian, 9 or 9 per cent. were attacked with the disease. The immunity of steamships is also against the infective theory. Erichsen's idea that the disease was due to the use of insufficiently sterilized tinned meat was disproved. Sterilization of food at a temperature of 120° C. produced the disease in chickens, but if the food were heated up to about 100° C. for 30 minutes it failed to do so. Salted meat was better than the tinned meat diets. In 1894 peas were reduced in the dietary, which seemed to reduce the anti-neuritic content quite materially. Biscuit was then eliminated in favor of white bread with small amounts of rye meal. Bread prepared with yeast was less dangerous to pigeons than bread made from baking powder. Rye bread was better than white but not devoid of danger. The author says that Norwegian beri-beri ran the same course as the beri-beri of the tropics and the increased frequency of the disease coincided with three changes in the diet made in 1894. These were the replacement of salt by tinned meats, reduction in the pea ration, replacement of the biscuit by the white flour. Each of these changes caused a reduction in the anti-neuritic material so called. In the experience of the authors the disease was cured by fresh vegetables, potatoes and fruit. Beer, eggs and oatmeal are useful.

Yacoub<sup>11</sup> describes three cases which developed beri-beri following relapsing fever and to whom condensed milk was given exclusively because of the gastritis of the relapsing fever. He ascribes the disease to the lack of vitamins. Two of the patients died, one with acute pernicious polyneuritis, the other with marasmus.

*Symptoms.*—The chief contributions to the symptomatology come from an interesting report by Riddell, Smith and Igaravidez of an epidemic at U. S. Army Base Hospital at San Juan, Porto Rico, and from observations of Sicard, Roger, Ohida and Iida, who have studied the cerebrospinal fluids quite extensively.

The report of the epidemic at San Juan<sup>12</sup> gives a number of interesting notes on the disease. The authors say that when cases of polyneuritis began to come into the base hospital at San Juan, from Camp Las Casas, Porto Rico, it was difficult to decide whether they were those due to dietary deficiency or the result of specific infections, as a serious epidemic of influenza had just occurred. After a careful study of the clinical manifestations and complete laboratory reports, it was evident they were dealing with beri-beri, as seen in the Orient. This is the first time that beri-beri has been diagnosed as such in the island of Porto Rico. The sanitary inspector gave a complete detailed report of the diet of the 373d Regiment, from which regiment the majority of the cases came.

<sup>11</sup> Practitioner, March, 1918.

<sup>12</sup> J. A. M. A., Feb. 22, 1919.

The investigation and report of the food used revealed that: Polished rice was a staple article of food during the months of September, October and November, 1918. It was served on an average of two meals a day during that period. While the ration was well balanced, there was a deficiency in fresh vegetables due to local conditions. The only vegetables served in large quantities were potatoes and the different varieties of beans. A large amount of canned meats and canned vegetables were used.

On questioning the patients suffering from beri-beri, it was learned that those affected were rice eaters and consumed their full rice component of the daily ration, 3.3 pounds a week. Most of them did not eat their meat ration, and those who did eat meat ate sparingly of it.

1. *Blood*.—The average percentage of hemoglobin in forty-seven patients suffering from beri-beri or polyneuritis was 72.64.

The differential count in twelve cases showed an average in polymorphonuclears of 45.83 per cent. and in small mononuclears of 38.75 per cent.

2. *Urine*.—The examination of urine in thirty-nine patients disclosed no albumin. Of this examination 38.46 per cent. disclosed hyaline casts and 15.38 per cent. hyaline and granular casts.

3. *Feces*.—Of these examinations, 90.47 per cent. revealed uncinaria ova, in a few instances associated with other parasites.

4. *Swabs*.—In swabs from the throats and noses of thirteen patients inoculated in proper mediums, nothing important was detected.

5. *Spinal fluid*.—In Case 12 (Reg. No. 5861) the spinal fluid was clear and showed 3 white cells, 14 red cells and 3 cells undetermined to the cubic centimeter.

6. *Necropsy*.—The examination of L. M. (Reg. No. 5937) resulted in these findings:

The body was well developed. Rigor mortis was fairly well marked. There was edema of the lower extremities, especially of the ankles. The face was cyanotic, with a large amount of foamy secretion coming from the mouth and nose. Hypostatic congestion was well defined. When the thorax was opened, fluid blood of dark color escaped through the injured vessels with ease. Considerable edema was noticed on both lungs. On section the lungs showed signs of edema. The pleural cavities of both sides contained a moderate amount of fluid. The pericardium contained about 2 ounces of fluid. The heart was large, especially the right heart, where there was considerable thinning of the walls, with very marked dilatation. The thoracic vessels were normal. The diaphragm was well developed. The liver was somewhat enlarged, but of normal appearance and consistency. Section did not show any internal macroscopic change. The pancreas was normal. The stomach and intestines were normal. No parasites were found in the ileum. The spleen was somewhat diminished in size, but did not show any macro-

scopic change. The omentum was rather reduced in size. The kidneys showed some degree of congestion. No macroscopic change could be found in the brain, meninges and upper portion of cord. The cerebrospinal fluid was clear. The penis had a long prepuce. The scrotum was edematous.

7. *Cultures*.—Cultures made from the heart and lungs at postmortem were negative.

8. *Microscopic examination*.—Preliminary microscopic examination of the spleen, heart, kidneys and liver sustained the macroscopic appearance.

Ohida<sup>13</sup> writes that in certain cases of beri-beri the pressure of the cerebrospinal fluid was found to be increased; in acute cases it was found to be 180–280 mm., and in slight cases as low as 100. Miura has noted that when the cerebrospinal tension is high the blood pressure may be low. A case is reported when the former was 250 mm. and that of the blood 60–80. At the autopsy no meningeal lesion was found. It is possible that the vomiting found in late stages of severe cases may be due to central irritation from this increased pressure, as also the increased reflexes seen at the beginning of the attacks. In all cases prognosis is grave when the pressure is markedly increased. By experiments on rabbits the cerebrospinal fluid of a patient with a high pressure was found to have a powerful vaso-constrictor action.

Sicard and Roger<sup>14</sup> utilizing the opportunity of the epidemic among the coolies at Marseilles carried out an investigation of the cerebrospinal fluid in beri-beri to determine whether it would throw any light on the etiology of the disease. The wet form is associated with effusions into serous cavities, and it was thought that an increase might occur from the meninges and give rise to some of the nerve symptoms of the disease. The results were entirely negative. Lumbar puncture rarely showed any alteration in pressure of the cerebrospinal fluid, and this gave no cellular evidence of inflammatory changes nor increase of albumen, neither were there any marked chemical alterations.

Iida<sup>15</sup> found the pressure of the cerebrospinal fluid to be greatly increased in certain cases of beri-beri, especially those in the acute stage. This was found to be 180–280 mm. in certain cases, and then as low as 100 mm. in slight cases. Miura has called attention to the observation that in these cases the blood pressure is low, but that the cerebrospinal fluid is under high tension. A case in point was that of a young student seized with a violent attack, marked by exaggerated reflexes, vomiting, and motor disorders. The blood pressure was 60–80 mm. but that of the cerebrospinal fluid was 250 mm. Ten mils were

<sup>13</sup> Ohida, H., Examination of the Cerebrospinal Fluid in Beriberi, Home and Foreign Med. News, 1917, July 5.

<sup>14</sup> Sicard, J. A., and Roger, H., Le liquide céphalo-rachidien des béri-beriques, Bull. et Mém. Soc. Méd. Hôpit. de Paris, 1918, Feb. 21.

<sup>15</sup> Iida, H., Beri-beri and the Cerebrospinal Fluid, Chugai Iji Shimpo (Home and Foreign Medical News), No. 895, July 5, 1917.

removed from the spine and this reduced the pressure to 180 mm. but it rose again to 190 mm. At autopsy there was no meningeal lesion to account for the heightened fluid pressure. The question has arisen as to whether in this case the nausea and repeated vomiting were not caused by central irritation from the increased pressure. So with the heightened reflexes commonly observed at the beginning of an attack, but commonly attributed to more direct nerve irritation. The prognosis is very grave in cases in which the pressure increase is very marked.

Solutions of the cerebrospinal fluid of a patient with high pressure was perfused through the rabbit ear preparation and the number of drops flowing from the cut end of the artery was greatly decreased as a result. The powerful vasoconstrictor action of this fluid was thus demonstrated.

*Pathology.*—Ohno and Honda have contributed to the pathology. The former limiting his studies to the suprarenal gland, the latter giving a complete study of the changes found.

Ohno<sup>16</sup> estimated the amount of adrenalin in the adrenal glands of twelve cases of beri-beri, using Comessatti's method. He found an increase in the adrenalin content over that found in the average bodies. There was also a definite hypertrophy of the medulla of the suprarenals associated with the increased secretion, but he was unable to state what relationship it had.

Honda<sup>17</sup> has made a searching pathological study of the changes in 45 patients dying of beri-beri, including the alterations of nervous structures, muscular tissues, intestines and bone. Honda after commenting on his former studies on the same subject says that the myelinated fibers of the nervous system seem to be more affected than the non-myelinated ones. The vagus and the sympathetic seem to be less involved than the peripheral motor systems. The cardiac branches in the cardiac muscle are not often involved, the esophageal and branchial branches are also spared. The fine unmyelinated fibers in the peripheral nerve bundles seem to escape even when a large nerve sheath is thoroughly affected. Finer myelinated fibers are also less involved. Sympathetic ganglia changes are however present, those of the celiac plexus being most pronounced. There are extensive changes in the motor cells of the anterior horns in the cord but these changes are held by Honda to be more or less secondary or toxic and quite capable of recovery. The author considers that the acute emphysema in wet beri-beri must not be regarded as a result of changes in the vagus, and the increased volume of the lungs in those cases is due to congestion and edema, the result of changes in the heart muscles. Cirrhosis of the liver, sometimes seen in kakke, and said to be characteristic by Kasai, also the

<sup>16</sup> Ohno, Seishichi, The Adrenalin Content of the Suprarenals in Beri-beri Corpses, *Mitteil. Med. Gesellsch. z. Tokio*, 1917, Mar. 5.

<sup>17</sup> *Mitth. Med. Gesell. Tokio*, Dec., 1917.

tates like changes in the spinal cord noted by Dürck, were not met with by Honda.

Changes in the muscular system show two forms, a primary which is caused directly by the toxin, and a secondary which is a consequence of changes in the nerve supply. Fatty degeneration and cloudy swelling do not march parallel with the degree of change in the nerves and they belong therefore to the first group of primary changes; the same holds good with regard to the fatty degeneration of the heart muscle. Wet beri-beri may arise in any stage of alteration of the nerves; it is not always proportionately related to the severity of the phenomena of paralysis of the respiratory muscles and nerves of the extremities. Undoubtedly two forms of beri-beri are to be distinguished, one attacking the nervous system; the acute exacerbations of a more or less chronic form of beri-beri and the true "Shoshin" type are essentially the same, and are produced by an acute depression of the cardiac power. The easily altered character of the heart action is mainly caused by anatomical changes in the heart muscle, a direct result of the kakke toxin; the influence of changes in the innervating nerves is, in the author's view, very trifling. In infantile beri-beri the loss of voice is undoubtedly due to anatomical lesions of the innervating nerves, and consequently of the laryngeal muscles.

*Etiology.*—A number of experimental and comparative studies have appeared, notably those by Weill and Mouriquand,<sup>18</sup> who produced in birds and animals an acute paralytic condition by feeding them on decorticated or sterilized foods; the symptoms appearing between the 20th and 40th day, and being generally susceptible of cure by a change to diet which had the deficient anti-neuritic properties. This is similar to the acute condition of beri-beri in man, but differs from the common chronic form. The authors' investigations were carried out to produce a syndrome in birds which would be analogous to the latter. Pigeons were used. When fed upon a mixture of rice, barley, and maize, sterilized for 1½ hours at 120° C., paralysis and death occurred between the 40th and 90th day. The food for the production of the chronic syndrome consisted of one third rice, barley, or maize, raw, and equal parts of the other two sterilized. By this method the paralysis did not appear until much later, 250 to 440 days. It commenced in the wings, later affecting the legs, and the return to normal diet did not produce a cure, thus differing from what occurs in the acute form. From the experiments it would appear that the paralysis is clinically "functional" in the acute form, and that definite pathological lesions are produced in the chronic condition.

De Mello, Loundó and Rebello<sup>19</sup> have given an extensive compara-

<sup>18</sup> Weill, E., and Mouriquand, G., Syndrome béribérique expérimental chronique, C. R. Soc. Biol., 1918, Apr. 27.

<sup>19</sup> de Mello, Froilano, Loundó, Ramacrisna, and Rebello, Frederico, Etudes sur le Béribéri humain et aviaire, Anals Scient. da Facul. de Med. do Porto, 1917, Vol. 4, No. 1, pp. 6-72. With 2 plates and 10 charts.



tive study which is divided into four parts. In the first a description is given of some experimental researches upon human beri-beri and polyneuritis gallinarum. The results of these are in agreement with those of recent investigators and show that the ingestion of white rice produces in fowls and pigeons a definite polyneuritis, which would be best called polyneuritis avium; the bacillary theory received no confirmation from these experiments. They found that Java rice, which was used at Goa for the nourishment of the Portuguese soldiers and Austrian laborers, was able to induce beri-beri, and that rice bran had a therapeutic value in these cases; also that the preventive properties found in the cortical part of red rice are also present in several legumes. Some experiments on pigeons went to show that similar conditions to those seen in infantile beri-beri could be produced in birds. They conclude that beri-beri is an alimentary disease and not an infectious one, due to the food being deprived of certain essential substances, which substances have a therapeutic action and a preventive action; those found in legumes being able to prevent and cure cases of the disease which have originated from the use of decorticated rice and they believe human beri-beri and polyneuritis avium to be identical conditions.

In the second part a resumé is given of the various epidemics recorded and the theories which have been held as to their etiology from 1891 to the present time. This part is very interesting reading and has been most carefully prepared for the use of those who have not the opportunity of reading the originals, and those who are particularly interested in the subject are specially advised to consult Vedder's recent book on beri-beri and the Tropical Diseases Bulletin.

The third part is a more detailed report on the epidemic of beri-beri which developed on board the Austro-German ships in the port of Mormugao, giving descriptions of the cases which, however, were not numerous. They conclude that the disease was true beri-beri produced by the food, Java rice, which was used very largely and was found by experiments on pigeons to give rise to polyneuritis.

In the fourth part they quote instances found in the old Hindoo works ordering the use of legumes for the protection of health.

The whole is a powerful advocacy of the deficiency theory as an explanation of beri-beri in the East, though there is very little new recorded in it.

Voegtlin and Myers<sup>20</sup> give promise of getting closer to the heart of the matter although they do not, in the reviewers opinion quite get the right slant. The vitamin hypothesis while approaching the problem is clouded by the animism of the word vitamin. Voegtlin and Myers inadvertently in their suggestion to use the phosphorus as an indicator of the vitamin content, have let the cat out of the bag and led the way

<sup>20</sup> Voegtlin, Carl, and Myers, C. N., Phosphorus as an Indicator of the "Vitamin" Content of Corn and Wheat Products, Public Health Rep., 1918, June 7, Vol. 33, No. 23, pp. 911-917.

to the large problem of the function of phosphorus in the human machine. Their study is worth a few lines, although bearing more on the chemical testing of vitamine content. Much work has been carried out, they say, showing that the vitamine is not evenly distributed in corn grains. Stanton and Fraser showed that the phosphoric oxide  $P_2O_5$ , was a good indicator of the value of a sample. This has been to a great extent confirmed by other investigators. The authors have made a systematic analysis of different corn products, giving in detail their methods of estimating the quantity of  $P_2O_5$ , and they are satisfied from their experiments that it yields satisfactory information as to the content of vitamine products or accessory foods. Three tables are compiled showing these characters: (1) corn products—content in  $P_2O_5$  and vitamins; (2)  $P_2O_5$  content of various products from the same run of corn; (3) wheat products—content in  $P_2O_5$  and vitamins. A diagram illustrates the flour milling process and distribution of phosphorus. They all show that where the vitamins (fat soluble and anti-neuritic) are high the  $P_2O_5$  is also high.

McCarrison in his recent address strikes nearer our own concept of the problem which latter may be hastily sketched somewhat as follows: The human machine is a machine, an energy system which captures, transforms and delivers energy. Stated in terms of anatomy, this is carried out mostly by means of nerve structures, termed receptors, connectors and effectors. Certain capture mechanisms are probably not in the nature of receptor nerve structures, but are physical and chemical mechanisms whereby the energy of many chemical elements may be partly utilized in the energy system. There are 26 of these elements, parts of whose specific energy combinations have been integrated into what we call the human body.

As to the understanding of the dynamics of these chemical-biochemical processes, we are still as children groping in the dark, although Liebig as many as 50 years ago, impatient that he could get no audience, almost screamed the importance of the topic of the dynamic transforming capacities of biochemical interchange. The human body, as a congeries of transforming mechanisms to hand on energy for conduct, or human behavior, is still too big a concept for the mind to grasp. It is dealt with, even by the experts in food transformations, as a closed machine, working within itself, and deriving its chief supply of energy from food. This is, we believe, an infantile concept. The actual energy supplied by the chemical elements is infinitesimal in view of the energy delivered by the human machine, and the calorie test, a bit of bumble puppy. The chemical elements simply supply material by which energy transformation may be brought about.

The whole question of beri-beri resolves itself about the problem of deficiency, chiefly phosphorus deficiency, a certain percentage amount of which has been integrated within the human body and carries in its transforming capacities through its complex biochemical products.

The problem arises is there any localized mechanism for the regulation of the amounts of this one of the 26 integrated chemical elements, in a sense similar to the rôle played by the thyroid substance in its iodine-regulating mechanism, or the parathyroid for calcium intake, outgo or special storage. All of the comparative evidence concerning specialized structure development tends to show that such functional structuralizations merely represent points of maximum deposit. Thus accessory thyroid, parathyroid, suprarenal and other minor deposits of specialized structures points to the fact that whereas the main deposits afford probably the major regulatory functions, still they are but parts of the special machinery in each case. This fact seems to have been entirely overlooked by many physiologists and we have a lot of premature generalizations concerning the action of this or that organ of the body, because isolated (?) from the rest of the body, the function is so and so. The physiological isolation of the suprarenals, for instance, does not eliminate entirely the action of scores of smaller deposits of chromaffine tissue.

It is because McCarrison is approaching this angle of the problem that so much space is given to his study. While we are personally inclined to see in the hypophyseal structures a special functional regulatory mechanism for phosphorus distribution, the evidence—acromegaly for example and bony (phosphorus) disturbances, which cannot be entered into here but is more fully discussed in Jelliffe and White, *Diseases of the Nervous System (Bony Syndromes and Pituitary)*—seems to point to the hypophysis as one of the structures involved in the parasympathetic over action which involves hyperphosphorus retention and utilization in bone (acromegaly), in fat (*adiporus dolorosa*), and in other compensatory developments, through interrelated endocrinous balancing.

McCarrison<sup>21</sup> says that in reading the literature of disease due to deficiency of certain accessory food factors one can not fail to be struck by the fact that however complete our observations have been in some directions there are others in which inquiry has been almost wholly neglected. The want of substances essential for the normal metabolism of the human or animal body suggests the need for examining the effects of their deficiency on the organs responsible for digestion and assimilation and for the regulation of metabolic processes. Yet our knowledge of these effects is very scanty. The influence of "vitaminic" deficiency on the adrenal glands, on the pancreas, on the liver and the spleen, is, so far as can be ascertained from available literature, unknown; while that on the thyroid apparatus has been but incompletely studied. Nor are we better informed with respect to other important structures of the body, as, for example, the pituitary gland and the reproductive organs. It has seemed to him desirable, therefore, to attempt to fill some of these gaps in our knowledge.

<sup>21</sup> McCarrison, Robert, *The Pathogenesis of Deficiency Disease*, The British Medical Journal, Feb. 15, 1917.

The morbid anatomical findings which he records he hopes may aid in a clearer comprehension of the genesis of diseases resulting from deficiency of certain accessory food factors—not only as regards their grosser evidences, as exemplified by beri-beri, but also as regards their minor manifestations. It is rare that the practicing physician, outside the tropics, meets with morbid states resulting from complete deprivation of accessory food factors. His own clinical experience leads him to believe that many are the minor maladies associated with the incomplete provision of these substances in the food of children especially, or with their incomplete assimilation. Be this as it may, the laboratory experience gained in the prosecution of this research has afforded no small measure of assistance in dealing with cases of "bilious vomiting," acidosis, mucous disease, and other metabolic disorders of childhood which have of late been referred to him. He draws the attention of physicians, especially those connected with the great children's hospitals, to the effects of "vitaminic" deficiency not only on the central nervous system, but also on the liver, the pancreas, the spleen, the pituitary, the thymus, the thyroid, the reproductive organs, and the adrenal sympathetic system; the functional perfection of all being of such vital importance to the growing child. In considering these problems in the laboratory it is necessary to observe the results of "vitaminic" deficiency in healthy animals and also to consider them in connection with other pathogenic factors which may operate in nature. For example, both inanition and a diet too rich in starch and too poor in "vitamines" lead to depression of biliary, pancreatic, and gastro-intestinal function. If these organs are exposed in addition to the influence of toxic or bacterial agencies, their depression will be manifestly greater. The purity of laboratory experimentation is rarely repeated in nature. The manifold toxic influences to which human beings are subjected under conditions of food deficiency must play an important part in further depressing the functional activity of these organs and tissues on which normal metabolism is dependent. The toxic products of intestinal bacteria or intestinal parasites may thus assume a rôle of high importance in the genesis of morbid states which are, no doubt, initiated by the dietetic defect.

During the year 1914, and during 1918, he fed a large number of pigeons on a diet consisting solely of polished rice—that is to say, on a diet composed mainly of starch, with less than 10 per cent. of protein, and with complete absence of accessory food factors; 168 of these birds developed polyn neuritis avium within the period of the experiments. The heart's blood and the internal organs of 142 birds so fed were examined bacteriologically at autopsy; of these, 94 were found to have had concurrent septicemic infections of various kinds, while the heart's blood and organs of 48 were sterile. Four out of 142 had tuberculous disease of the lungs or abdominal viscera, or both.

Seventy-two pigeons were employed as controls; the blood and internal organs of 63 were examined bacteriologically at the time of

death. Six were found to have septicemic infections of various kinds; two had tuberculous peritonitis. The incidence of tuberculous disease in the pigeons employed was thus 2.7 per cent. The organs of a large number of these birds were weighed immediately after the death of the animals.

The following conclusions have been reached as a result of clinical, morbid anatomical, histological, and bacteriological observations. For details of the research the full paper, which will be published in the Indian Journal of Medical Research, should be consulted.

1. The absence of certain accessory food factors from the dietary—improperly termed “anti-neuritic”—leads not only to functional and degenerative changes in the central nervous system, but to similar changes in every organ and tissue of the body. The morbid state to which their absence gives rise is not to be interpreted as only neuritis.

2. The symptom complex resulting from the absence of these substances is due (*a*) to chronic inanition (*b*) to derangement of function of the organs of digestion and assimilation; (*c*) to disordered endocrine function; (*d*) to malnutrition of the nervous system, and (*e*) to hyperadrenalinemia.

3. Certain organs undergo hypertrophy; others atrophy. Those which hypertrophy are the adrenals. Those which atrophy, and in the order of severity named, are the thymus, the testicles, the spleen, the ovary, the pancreas, the heart, the liver, the kidneys, the stomach, the thyroid, and the brain. The pituitary gland showed in adult birds a slight tendency to enlargement in males only.

4. The enlargement of the adrenals is a true hypertrophy in so far as it is associated with a proportionate increase of the glands' adrenalin content. The quantity and quality of adrenalin in the hypertrophied organ is, area for area, approximately the same as that found in the adrenals in health. The hypertrophy is equally well marked in both sexes.

5. Edema has invariably (100 per cent.) been associated with great hypertrophy of the adrenal glands, while 85 per cent. of all cases having great hypertrophy of these organs had edema in some form. The amount of adrenalin, as determined by physiological methods, in such cases has been considerably in excess of that found in cases not presenting this symptom, and greatly in excess of that found in normal adrenals.

6. Inanition gives rise to a similar state of adrenal hypertrophy, and to a similar state of atrophy of other organs, the brain itself possibly excepted.

7. The edema of inanition and of beri-beri is believed to be initiated by the increased intracapillary pressure which results from the increased production of adrenalin, acting in association with malnutrition of the tissues. Failure of the circulation and venous stasis may subsequently

contribute to it. Age is an important factor determining its occurrence. This finding is held to account in great measure for the occurrence of "war edema" amongst prisoners of war in Germany.

8. Wet beri-beri and dry beri-beri are essentially the same disease; the former differs from the latter in the greater derangement of the adrenal glands.

9. Gastric, intestinal, biliary and pancreatic insufficiency are important consequences of a dietary too rich in starch and too poor in "vitamines" and other essential constituents of the food. It is suggested that some of the obscure metabolic disorders of childhood might be examined from this viewpoint as well as from that of endocrine gland starvation.

10. A state of acidosis results from the absence of so-called "anti-neuritic vitamins"; this state is due to the imperfect metabolism of carbohydrates and to acid fermentation of starches in the intestinal tract. Clinically, it is evidenced by progressive showing and deepening of the respirations.

11. Great atrophy of muscular tissue results from deficiency of accessory food factors; it is due, he believes, in part to the disturbance of carbohydrate metabolism in consequence of disordered endocrine function, in part to the action of the adrenals in supplying blood to the vegetative organs of the body at the expense of the muscles.

12. Profound atrophy of the reproductive organs is an important consequence of "vitaminic" deficiency. It leads to the cessation of the function of spermatogenesis. In the human subject such degrees of atrophy would result in sterility in males and in amenorrhea and sterility in females. This finding is held to account in great measure for the occurrence of "war amenorrhea."

13. The central nervous system atrophies little: paralytic symptoms, when they occur, are due mainly to impaired functional activity of nerve cells; much more rarely to their degeneration.

14. It is thought that, because of their atrophy out of all proportion to other tissues, the thymus, the testicles, the ovary, and the spleen provide a reserve of accessory food factors for use on occasions of metabolic stress. This reserve, however, is rapidly exhausted.

15. The bones are thinned, and there is a loss of bone marrow.

16. The red cells of the blood are diminished by about 20 per cent.

17. The whole morbid process is believed to be the result of nuclear starvation of all tissue cells. Even the adrenals, which alone of all organs of the body undergo enlargement, show on section changes in some of their cells indicative of nuclear starvation. Accessory food factors are nuclear nourishers.

18. Finally, although deficiency of certain accessory food factors is the essential etiological agent in the genesis of beri-beri, it is held that infectious and parasitic agencies are often important causes determining the onset of symptoms.



"Vitaminic" deficiency renders the body very liable to be overrun by the rank growth of bacteria.

It may be seen from this lengthy abstract that a way is being made into the difficult problem of distribution of materials needed by the body in carrying on its job as an energy system for capturing, transforming and delivering energy. The vitamine problem is less a problem of a general biochemical synthetic product—termed vitamine, or anti-neuritic element—it is one we believe, specifically related to the handling of the chemical element phosphorus to make its chemical properties valuable in the upkeep of the receptors, connectors and effectors of the body. Beri-beri is simply an extreme illustration of what happens to nerve structures by reason of a disturbance of needed structural contents, with special reference to the phosphorus needs of the body and the dynamic transformers which need this element to build up its vast group of chemical mechanisms.

The lack of phosphorus seems to be related therefore to an over-compensating pituitary-adrenal synergism which is endeavoring to keep up the tonus of the vegetative system with structurally insufficient material-phosphorus, and all its complicated nucleoproteid transforming mechanisms.

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## Current Literature

### I. VEGETATIVE NEUROLOGY

#### 1. VEGETATIVE NERVOUS SYSTEM.

**Leriche, R., and Heitz, J.** THE PHYSIOLOGICAL EFFECTS OF PERIPHERAL SYMPATHECTOMY (LOCAL THERMIC REACTION AND HYPERTENSION). [Compt. Rend. Soc. de Biol., 1917, LXX, p. 66.]

Removal of the peri-arterial sympathetic plexus is followed almost constantly by a vaso-dilator reaction. The writers have operated on the sympathetic plexus of the brachial artery in eight cases, and on that of the femoral artery in one case. One of the cases was a causalgia of the median nerve, the eight others being cases of reflex paretic or spasmodic phenomena of the Babinski-Froment type. The immediate effect of the operation is a great contraction of the artery, with loss of pulse and coldness of the periphery. Sometimes after only six or seven hours, commonly about fifteen, rarely as late as 36 hours after operation, there is vaso-dilation with elevation of the temperature of the limb; it may be even two degrees higher than on the sound side. A severe burning sensation may now be felt. This thermic reaction is constant, but may vary in degree and duration. There is also a rise of arterial pressure in the operated limb. These changes are temporary; the hypertension disappears about the fifteenth day, but the local hyperthermia occasionally persists for ten or fifteen more. The writers refer to the fact that Claude Bernard (1876) found that section of the peripheral sympathetic filaments of the horse gave an intense vaso-dilatation. [Leonard J. Kidd (London, England).]

**Girou, Emile.** THE CAUSALGÆ AND THE PAINFUL SYNDROMES OF SYMPATHETIC ORIGIN. [Presse Médicale, 1918, XXVI, p. 584.]

Among the sequelæ of injuries of the peripheral nerves the true causalgia have to be distinguished from the painful affections caused by the coincident lesions of the sympathetic fibers which run in those nerves. To the peripheral nerves, properly so called, belong the voluntary motor innervation and conscious sensibility. To the sympathetic system belong maintenance of muscle tonus, at any rate in repose, the vasomotor and trophic innervation of certain tissues, and probably also a certain unconscious sensibility. While the characteristics of lesions of peripheral nerves are paralyses and various sensory disorders, those of the sympathetic are contractures, and trophic and circulatory disturb-

ances. The treatment of these two affections naturally varies: in the true causalgia, first described by Weir Mitchell, one has to suppress the conduction of the painful sensations to the conscious nerve centers. To do this, Sicard injects 60 per cent. alcohol into the affected nerve, Girou gets the same result by tying the nerve moderately tightly with number 2 catgut. In the case of the median nerve, this ligature must be applied high up on the nerve above the point at which it receives its sympathetic filaments with its special artery. A morphine injection must be given at the end of the operation, for otherwise there is severe pain for an hour or so after the ligation. In the case of pains due to an irritative lesion of the sympathetic, benefit is obtained by Leriche's periarterial sympathectomy. So also sympathectomy is the treatment for non-painful contractures of sympathetic origin. [Leonard J. Kidd, (London, England).]

**Macht, D. I.** CHEMICAL STRUCTURE OF OPIUM ALKALOIDS AND SMOOTH MUSCLE STRUCTURES. [Proc. Am. Soc. Pharmacol., 1917.]

The author had previously shown that the effects of the opium alkaloids on the ureter, the six principal alkaloids of the opium series can be sharply divided into two classes. The pyridin-phenanthrene group, comprising morphin, codein, thebain and their derivatives increases the contractions of the ureter and raises its tonus; on the other hand the benzyl-isoquinoline group, comprising papaverin, narcotin and narcein inhibits the contractions and markedly lowers the tonus of that organ. A further analysis of the effect of the opium alkaloids on the ureteral contractions and tonicity showed that the stimulating properties of the morphin group on the ureter are to be ascribed to the pyridin grouping of their molecules, and the inhibitory and tonus lowering properties of papaverin and its related alkaloids depend mainly on the presence of the benzyl grouping in their molecules.

From further work on the uterus, urinary bladder, gall bladder, intestines, ureter, vas deferens, bile ducts, bronchioles, and blood vessels (isolated and perfused) it was found that the six principal opium alkaloids, morphin, codein, thebain, papaverin, narcotin, narcein, act in two ways. The pyridin-phenanthrene group comprising morphin, codein and thebain and their substitution products, produce an increase in the tonus and rate of the contractions of the various kinds of smooth muscle structures studied, an effect which seems to be due to the pyridin nucleus of their molecules. On the other hand the benzyl-isoquinoline group comprising papaverin, narcotin and narcein produce inhibition of the contractions and relaxation of the tonus of various smooth muscle structures studied, this effect apparently being due to the benzyl nucleus of their molecules.

**Negro, C.** BLUE TOURNESOL POWDER IN THE TOPOGRAPHICAL STUDY OF LOCAL SWEATING. [*Arch. Ital. de Biol.*, 1918, LXVIII, p. 131.]

In 1915, Jumentié described his experiences with the use of tournesol paper in the topographical study of local cutaneous sweatings in cases of lesions of the nerves or of the spinal cord. Twelve years previously, however, C. Negro used a tournesol powder which he finds much superior to Jumentié's paper. After years of study by this method, he finds the best method is to make a mixture of blue tournesol powder and powdered tartaric acid in the proportion of one part of tartaric acid and three parts of tournesol. When this mixed powder comes in contact with drops of sweat on the skin, the tartaric acid, which is very soluble, produces rapidly a red coloration of the tournesol powder with which it is mixed. By this means the limits of the sweating area are very clearly marked off from those of the dry cutaneous area. [Leonard J. Kidd (London, England).]

**Rijnberk, G. v.** THE SKIN-SHAKING REFLEX IN THE CAT. [*Arch. neer. de physiol.*, 1918, 2, 505-510.]

Proprioceptive and exteroceptive stimuli cause the skin-shaking reflex in the cat but not so easily as in the dog. The reflex is always bilateral, the effector apparatus being the great cutaneous muscle. Not easily defined the receptor fields do not correspond with a definite anatomical complex. The receptor apparatus of the proprioceptive reflex seems to be in the dorsal muscles attached to the vertebrae or in the periosteum, the primary dorsal divisions of the sacral, lumbar and dorsal nerves being the ones that transmit the afferent impulses. Efferent paths are found in the ventral roots of C 7 and 8. Decerebration does not destroy the center, in which some organization exists, a contraction in various areas of the skin being produced by separate fields in the reflexogenic zone. [J.]

**Witrebort, P.** LATENT AUTOMATISM IN SELACHIAN EMBRYO. [*Compt. Rend.*, 1918, 167, 86-88.]

Muscle and nerve separated physiologically by curare or by increase of temperature showed that contractility, muscular automatism, while transitory in ontogenesis occurs earlier than the nervous functions. The latter are more vulnerable than are the muscular ones.

**Chalier, J.** MITRAL STENOSIS AND RAYNAUD'S DISEASE. [*Presse Méd.*, Sept. 12, 1918.]

The author lays stress upon the manifold etiology of Raynaud's disease and the importance of cardiac disorders, especially mitral stenosis, among its several causes. He reports no less than six cases, personally observed, which occurred in association with mitral stenosis. In all the cardiac condition, judging from the physical examination or the anam-

nesis and the time of appearance of the functional disturbances, preceded the Raynaud condition. As mitral stenosis is rather easily overlooked, it should be examined for carefully and repeatedly in cases of Raynaud's disease. That both the heart defect and the Raynaud condition may result from acute rheumatism is not probable, a considerable interval generally elapsing between the last rheumatic attack and the involvement of the extremities. In three of the six cases no rheumatic manifestation was elicited. Tuberculosis as a cause of Raynaud's disease deserves greater attention, and its rôle in some instances is gradually being accepted. Roque has emphasized the marked similarity of Raynaud's syndrome with a series of skin manifestations of the extremities, belonging to the group of the tuberculides of Darier, and believes that the tuberculous toxins, acting upon the vasomotor centers, play the chief etiological rôle, while the concomitant heart disorder exerts an adjuvant influence. Among the author's cases three had manifest tuberculous disease, to which the heart condition is ascribed. The strictly nervous, vasomotor theory of Raynaud's disease does not appeal to the author, though he recognizes vasomotor change as an exciting factor where there are underlying pathological conditions, cardiac or vascular, which reduce peripheral blood flow and blood pressure and predispose to gangrene.

**Rochat, G. F.** INCREASE OF INTRA-OCULAR PRESSURE BY STIMULATION OF THE SYMPATHETIC NERVE IN THE RABBIT. [*Arch. neerl. de physiol.*, 1918, 2, 545-551.]

Results from other animals are corroborated in these researches by means of photographic records of intraocular pressure. Stimulating the cervical sympathetic of the rabbits caused a fall in the pressure, but a sharp rise if the carotid is previously ligatured, showing that in all animals sympathetic stimulation causes elevation of pressure for a short time followed by a more lasting depression, the relation of the two antagonistic actions depending on different anatomical conditions. [J.]

**Plocher, R.** JUVENILE FAMILIAL GLAUKOMA. [*Klin. Mbl. f. Aughkl.*, May, 1918.]

In discussing here the chronic form of glaucoma which appears in one generation after another, Plocher seems to find that if once the disease misses one generation the probability is that succeeding generations will no longer be afflicted. Its appearance, as the author describes it, is by "anticipation," that is the manifestation in each new generation is at an earlier age than the preceding. Those in this series of cases who had the glaucoma were myopic and those who escaped were hypermetropic, though this rule does not always hold. The disease seemed to affect the sexes about equally. Two cases only responded favorably to treatment of any kind. In one only one eye was saved by sclerotomy

with prolapse of the iris, from which a filtration scar remained. Trephining by Elliot's method was successful in the other case. This method may prove itself successful, but so far the prognosis generally is not favorable. [J.]

**Auer, J., and Meltzer, S. J.** BLOOD-PRESSURE CURVE FOLLOWING AN INTRA-SPINAL INJECTION OF EPINEPHRIN. [Am. Jour. Physiol., Dec., 1918, 47, No. 3, p. 286.]

Intraspinal injections of 1 c.c. or 1.5 c.c. of epinephrin in the lumbar region of monkeys cause a rise of blood pressure in which the curve of blood pressure is generally characterized by a slow rise from the original level to the maximum height, a plateau-like duration of the maximum, over a slow fall. An intralumbar injection on the other hand causes a much more lasting effect on the rise of blood pressure than an intravenous injection. After intraspinal injections the pressure at the end of the pressor effect has not fallen below the original level. In human beings an intralumbar injection can be carried out with greater safety, and certainty than in monkeys, showing the advisability of such studies in clinical physiology.

## 2. ENDOCRINOPATHIES.

**Peabody, Clough, Sturgis, Wearn and Tompkins.** EPINEPHRIN IN IRRITABLE HEART OF SOLDIERS. [J. A. M. A., Dec. 7, 1918.]

This is a preliminary report on a collaboration on the injection of epinephrin in cases of "irritable heart." The one fact definitely established as to the physiologic action of epinephrin seems to be that it acts as a stimulant to the sympathetic nervous system, and this is, perhaps, sufficient to provide a basis for the interpretation of the results of their work. The patient, after lying quietly, in bed for an hour, was examined as to blood pressure, pulse rate and respiration, degree of tremor, sweating, temperature of hands, pulsation of vessels and general nervousness. When the blood pressure, pulse and respiration taken at intervals of five minutes are found constant, 0.5 c.c. of 1:1,000 solution of epinephrin is injected into the deltoid muscle. Records are then taken of the systolic and diastolic pressure every two minutes for ten minutes, then every five minutes for an hour, and then every ten minutes for half an hour, and changes in the symptoms, or the appearance of new symptoms, are noted. Positive reaction consists in the production of a rise in the systolic pressure or pulse rate of over ten or fifteen points, accompanied with other typical symptoms, such as flushing, sweating, increased tremor, general nervousness, etc. The reaction appears, usually, about twelve minutes after injection, is most marked at thirty-two minutes, on the average, and is finished in a little over an hour. Control observations were made on twenty-seven volunteers, carefully selected as to their conditions in life, etc., to correspond with the patients tested. The



clinical observations were made on a group of sixty-five soldiers representing what may be termed the "constitutionally inferior" type of patient with "irritable heart," a type very commonly seen in camps at the present time. They have given a history of being very easily exhausted, used to only light work, etc., and are easily fatigued by physical and mental exertion. Many of them are so-called neurasthenics, who can get along in civil life by favoring themselves, but break down under the strain of military service and report symptoms like those of organic heart disease. Physical examination shows little besides instability of rate, and they usually get the diagnosis of functional cardiac disease. The epinephrin test was found positive in thirty-nine, doubtful or suggestive in six, and negative in nineteen. This proportion of positives (60 per cent.) is interesting. Hypersensitiveness to epinephrin suggests that the sympathetic nervous system may play a part in causing the condition. The effects of epinephrin on basal metabolism and blood sugar determinations were also tested, both showing a rise in the positive cases. Electrocardiograms were also taken in twelve cases, before the reaction, at its height, and after it was finished, and the most constant change found was a slight decrease of the height of the T-wave. This always occurred in one lead, usually in two leads, and sometimes in all three leads. In individual cases other abnormalities were seen, as increase of a sinus arrhythmia; inversion of the P-wave; prolongation of the P-R interval, and partial heart block; inversion of the T-wave, and the production of ventricular extrasystoles.

**Atwell, W. J.** DEVELOPMENT OF THE HYPOPHYSIS CEREBRI. [Amer. Jour. Anat., Sept., 1918, 24, No. 23.]

The pars tuberalis develops out of the thickened epithelium lying just nasal to the early formed Rathke's pouch, appearing before the pars intermedia. From the epithelium very soon appear the lateral lobes as two ridge-like eminences. The pars tuberalis forms a thin layer lying in the pia mater of the diencephalic floor. Histologically it is distinct from both other parts of the hypophysis. [J.]

**Atwell, W. J.** THE DEVELOPMENT OF THE HYPOPHYSIS OF THE ANURA. [Anat. Rec., Sept., 1918, 15, No. 2.]

In the Anura the hypophysis is made up of a neural lobe and three epithelial lobes. Of the latter the pars tuberalis, found in the Amniota and in certain amphibia, at some time during development, is paired in origin, has a laminar structure and in the adult is located in the pia mater covering the tuber cinereum of the brain floor. [J.]

**Houssay, B. A.** THE PITUITARY BODY AND POLYURIA. [Endocrinology, Apr.-June, 1918.]

Summarizing his observations published in 1915, Houssay says that there occur in pituitary extracts both renocontractor and renodilator sub-

stances, one or the other predominating according to the circumstances, with the diuretic effects running parallel with the renovascular effects. From the pharmacological action of pituitary extract it is concluded that it is not permissible to deduce an insufficiency of the pituitary body from the successful use of the extracts in polyuria. Houssay does not agree with Cushing's claim that the cerebrospinal fluid has the same effects as pituitary extracts, as he demonstrated that the cerebrospinal fluid has not the diuretic nor the galactagogue actions which are the most specific tests of pituitary material; so that he does not believe that the active components of pituitary extracts pass to the cerebrospinal fluid. Operations for the removal of the pituitary gland produced oliguria in adult dogs and polyuria in puppies. These effects are due to trauma, and the intervention of the pituitary in the polyuria can be excluded, as the same results have been obtained when the whole gland was removed. In conclusion, the author adds that the cerebral basal zone can generate polyuria, and that it is not probable that the pituitary is a part of this zone, though the posterior lobe of the gland may be involved. He can not accept the theory that polyuria is due to a diuretic hypersecretion of the pituitary gland.

**Bergé, Andre, and Schulmann, Ernest.** THE RHYTHM OF PITUITARY POLYURIA. [*Presse Médicale*, 1819, XXVI, p. 618.]

The writers describe the state of urinary elimination in a woman suffering from polyuria, in whom necropsy revealed a gummatous lesion of the pituitary body. They conclude that pituitary polyuria is an anatomico-pathologically proved fact; that the quantity of urine eliminated in this disease is variable; that the polyuria is more marked by night than by day; that the relation between the amount of liquids ingested and that of the voided urine is disturbed, urinary excretion being at certain times greater than fluid absorption, with a considerable resulting dyshydration; that the urinary excretion is not notably modified by variations of diet; that there is no important disturbance of urinary chemistry, there being usually only a slowing of exchanges and tendency to demineralization; that the quantity of uric acid is slight; that there are no disturbances of glycuronic acid; that there is absolute renal integrity; and, finally, that the extract of the posterior lobe of the pituitary inhibits the polyuria. [Leonard J. Kidd (London, England).]

**Pardee, I. H.** PITUITARY HEADACHES. [*Arch. Int. Med.*, Feb., 1919, J. A. M. A.]

A disproportion between the pituitary body and the sella produces pressure on the sensory nerves to the dura; and by its encroachment on the cavernous sinuses it may cause interference with the cerebral circulation, the whole setting up the train of pituitary symptoms, including headache, as originally pointed out by Timme. Pardee describes pitu-

itary headache as having three characteristics: its location; its duration and persistence, and its relief under specific medication. The headache is situated "deep in the forehead behind the eyes." Deep pressure on the temples may elicit some tenderness. This headache is very persistent, usually lasting from one half hour to forty-eight hours, and it may be continuous, frequently coming on in the female at the time of the menses. It often leaves very suddenly, returning again with exacerbations; it is accentuated by excitement, stooping over, and by the ingestion of sugar. At the climax of the headache there may be nausea and vomiting, with which there will come relief. Marked fatigue accompanies the headache, the patient hardly being able to drag himself about, and there is present to stroking a broad white skin line as evidence of suprarenal deficiency caused by the drain on the suprarenal function by the exhausted pituitary. The patients feel slowed down in their activity, yawn excessively, are sluggish and willing at any moment to seek an opportunity for sleep. These patients are particularly prone to attacks of depression, which come on without any cause, and have as their basis some very insignificant fact. Knowing that the pituitary, together with the suprarenals, controls the mobilization of sugar in the body, it is not strange that these patients should have anomaly of sugar metabolism, as is seen in the periodic development of an intense craving for sweets, a sort of dipsomania, as it were, for sugar. The satisfaction of this desire being completed by eating candy, it is almost invariably followed by a typical pituitary headache. Owing to the increased demand on it, there is an enlargement of the pituitary gland, and following on this the suprarenals are called on to assist in mobilizing the sugar, the excessive drain on them causing great fatigue and the formation of a vicious circle. The administration of whole pituitary is a specific.  $\frac{1}{4}$  to 2 grains three times a day; an average for an adult is 1 grain, preferably given one hour after meals. Continuous medication with pituitary will result within a few days in a decrease in the intensity of the headaches; there will be a longer period between their occurrence, the head will feel less "tight," and fatigue, nausea, and vomiting will also disappear.

**Houssay, B. A.** EXTIRPATION OF THE HYPOPHYSIS IN THE DOG. [Primer Congreso Nacional de Medicina, Buenos Aires, Sept., 1916.]

Operating on 120 dogs with Cushing's method, had a high rate of mortality, although without ablation there were no deaths. Even without the extirpation of the gland there resulted great elimination of azotes in the first days, transitory glycosuria, great loss of weight, slow respiration, polyuria in young dogs and oliguria in adult dogs, and tachycardia. Young dogs stood the operation better. The complete operation without ablation rarely caused death and produced no perceptible change in the animals. Growth of young dogs was retarded or checked, but there was an increase in adiposity a month or two after

the operation, which did not yield to opotherapy nor did it develop equally with the testicular modifications. In some dogs there were a special infiltration of subcutaneous cellular tissue, with a mucous appearance and large ears like a pig; atrophy of the prostate and internal genitals, of the testicular seminiferous elements, though less of the interstitial elements. The only dental change was a retardation of development. In the blood of the young dogs there was diminution of red corpuscles and of hemoglobin. Several adults had no glycosuria, although dosed with saccharose (even as much as 350 gr.), lactose and maltose. The thyroid was modified in those that had been deprived of the hypophysis and were killed after several months. There was an excessive accumulation of colloid, epithelium aplani, and sometimes degenerative lesions; while parathyroids were normal or increased. The pancreas was red or white without histological alteration. None of these changes took place in those animals operated upon without ablation of the hypophysis. The anterior lobe is physiologically the most important part.

**Atwell, W. J., and Marinus, C. J.** ACTIVITY OF EXTRACTS OF THE PARS TUBERALIS AND OTHER REGIONS OF THE OX PITUITARY. [*Amer. Jour. Physiol.*, 1918, 47, 76-90.]

Finds that a pure extract of the pars intermedia of the fresh gland will produce in the rabbit a distinct rise in the blood pressure.

**Beck, H. G.** FAT REDISTRIBUTION IN THE HYPOPHYSEAL TYPE OF DYSTROPHY ADIPOSEGENITALIS. [*American Journal of the Medical Sciences*, November, 1918.]

Disordered function of the pituitary gives rise to various types of dystrophy, depending on overfunctioning—hyperpituitarism; underfunctioning—hypopituitarism; or perverted functioning—dyspituitarism. It is generally accepted that the fat dystrophies of pituitary origin are due to hyposecretion of the posterior lobe. The most commonly recognized form is known as hypophyseal dystrophy adiposogenitalis—typus Frölich, by whom it was described in 1901. The adiposity that is frequently associated with acromegaly is thought to be due to secondary involvement of the posterior lobe. My interest in this subject was awakened in 1915, when two patients consulted me with the same clinical pictures. The first case was that of a woman, aged forty-one years, five feet three inches tall, weighing 125 pounds. She was married, but never pregnant. Her health had been good until eighteen months previous, when menstruation became irregular and the flow gradually diminished until there was finally complete cessation. During the ten months preceding the examination she had gained about twenty pounds in weight. With this gain in weight she noticed an enormous increase in the circumference of the hips, upper thighs and abdomen, but there was no perceptible in-

crease in the circumference of the thorax, neck and upper arms or any increase in the size of the face, forearms and hands or legs and feet. In fact, these parts had the appearance of one under-nourished and emaciated; the features, when contrasted with the extraordinarily large hips and abdomen for a woman of her size, presented a striking abnormality in the configuration of her body. In addition she suffered with apathy, stupor and dullness, impairment of memory, sluggish bodily movements and trophic disturbances of the skin and hair. She was a confirmed invalid and unable to attend to ordinary household duties. Three fairly well-defined symptom groups were recognized in this case, namely, those referable to ovarian insufficiency—sterility and amenorrhea; those referable to pituitary insufficiency—abnormal character and distribution of fat; those referable to thyroid insufficiency—mental, neuromuscular and trophic skin disturbances. On the basis of a pluriglandular syndrome, hormotone, which contains the substance of the three glands involved, was prescribed. Four tablets, with the addition of two grains of thyroid, were given daily. The results were very striking. The patient was speedily restored to normal mental and bodily vigor and was able to perform her usual domestic duties without the least fatigue; but the most remarkable effect of treatment was upon the fat dystrophy, the so-called dystrophia adiposogenitalis, as evidenced by a rapid diminution in the circumference of the hips and abdomen.

This rapid diminution made it necessary to have her clothes frequently refitted. The measurements as recorded by her seamstress were as follows:

March 1. Two weeks before treatment: waist 30 inches, hips 43 inches.

May 8. After eight weeks' treatment: waist 26 inches; hips  $36\frac{1}{2}$  inches.

May 31. After eleven weeks' treatment: waist 25 inches, hips  $35\frac{1}{2}$  inches, a decrease of 5 inches in circumference at the waist and  $7\frac{1}{2}$  inches at the hips, with the loss of only one pound in weight (Fig. 1).

Thyroid was discontinued on June 14, but she continued to take four hormotone tablets daily until July 15, after which the glandular therapy was discontinued. Since then, a period of two years, she has had no return of symptoms and retained her normal weight and figure.

The result of organotherapy in both cases was as pronounced as it was mysterious. Although, according to both patients' statements, their busts had markedly developed, as well as the necks, arms and faces, yet there was no means of ascertaining, with any degree of accuracy, the extent of these alterations or the correctness of their statements. What actually became of the dystrophic fat was a matter of conjecture and had to be determined by further study and observation. This was accomplished by the simple method of mensuration systematically employed in a series of similar cases while under treatment. The results

clearly demonstrated that in a certain group, possibly 50 per cent., there is a redistribution of fat rather than a loss of fat.

The following is one of a series of twelve cases thus influenced to varying degrees by organotherapy: Mrs. B., aged forty-two years; weight 118 pounds. For six years she had suffered with chronic appendicitis and spastic constipation. During the previous year she developed symptoms of hypothyroidism, with mental dullness, loss of memory, somnolence, muscular and joint pains, snapping joints, subnormal temperature and a sense of profound exhaustion. Recently she noticed that large cushions of fat were accumulating about her hips and upper thighs, and she was unable to wear her usual clothes. Her friends also noticed this tendency. This deposit of fat extended down to the middle of the thighs and was particularly prominent over the gluteal region and above the ilia, where large folds appeared over the lateral aspect of the abdomen, forming a large curved outline beginning at the waist and extending to the middle of the thighs. There was also a big fold over the lower abdomen, with enlargement of the mons veneris, presenting a typical picture of dystrophy adiposogenitalis. The treatment consisted of the removal of the appendix and administration of thyroid and anterior pituitary lobe (P., D. & Co.). Fig. 4 shows the remarkable influence of this treatment upon the shape of the body, while the general improvement compares very favorably with the restoration to her normal shape, with a gain of three pounds in weight. After six months' treatment her weight was 124 pounds, axillary measurement 82½ cm., waist 66 cm. and hips 96¼ cm.

Other cases of this type, similarly treated, have demonstrated the fact that the fat is redistributed and that the mere weight of the patient is no criterion on which to base the results of treatment. The influence of organotherapy can best be determined by mensuration. The preceding cases represent the more usual type of hypophyseal dystrophy. Occasionally one meets with certain variations from this type. For example, in the more advanced cases the fat dystrophy is more general and includes enlargement of the breasts, with large scapular folds and cushions about the neck. However, the face, hands and forearms and feet and ankles usually escape.

There is a third group in which there is not only an increase in the accumulation of fat about the hips, buttocks, thighs and breasts, but in which there is also a unilateral increase. Three such cases occurred in my series. In conclusion, it is perhaps well to state that in none of the cases treated was any special attention paid to diet. The obesity is endogenous. The results may be attributed to the effect of the chemical stimulation of the cells by the hormones employed, thus favoring metabolism. The point to be emphasized is the fact that in certain cases of hypophyseal dystrophy the fat is actually redistributed and that the only exact means of determining the effect of treatment is by some systematic



method of recording measurements in addition to weight. [Author's Abstract.]

**Climenko, Hyman.** A CASE OF DYSPITUITARISM. [New York Medical Journal, July 6, 1918.]

The author reports a case which presented a multiplicity of symptoms, none of which showed relation to any single anatomical focus. Primarily, the patient suffered from a marked pituitary disturbance, called dyspituitarism because there were distinct signs of both hyperactivity and hypoactivity of the pituitary body. Later, signs of hypothyroidism made their appearance to be followed later by indications of hyperactivity of the thyroid, which indications were accompanied by manifestations of a disturbance of the psyche, the patient being morose, hypochondriacal and even suicidal. The author states that at the time of writing the psyche was somewhat improved, but that, besides the pituitary, thyroid and ovarian glands, the adrenals seemed to be involved. Organotherapy in all forms, combinations and doses was tried in the treatment of this patient, but without any notable effect. This case would seem to show that, when the metabolism of the endocrine confederacy is disturbed, no single gland can be held responsible as sole cause of the clinical picture; that at least some psychotic symptoms may be the result of the metabolic disturbance; and, in some of the well advanced cases of endocrine disturbance, opotherapy is of no avail. [Author's Abstract.]

## II. SENSORI-MOTOR NEUROLOGY

### 1. PERIPHERAL NERVES.

**Buzzard, E. F.** INJECTION OF ALCOHOL FOR THE RELIEF OF CAUSALGIA FROM GUNSHOT WOUNDS. [West London Med. Jour., 1918, p. 129.]

Patients suffering from median or internal popliteal causalgia suffer the most distressing results of modern warfare and gain little sympathy; nurses, and even medical men, regarded them as neurotic subjects and too greatly inclined to make the most of their injuries. Buzzard points out that when a large sensory nerve is injured, physical, psychical, auditory, and visual stimuli, frequently cause spasms of intolerable pain. The main object of treatment, therefore, is to give relief from such excruciating agony, permanent if possible, rest, mental and physical, and complete or partial isolation should be secured if possible. Drugs are extraordinarily unsuccessful and to be strongly deprecated lest they destroy what little morale the patient may still have.

Buzzard therefore explains to the patient that the pain is due to a partial injury of a nerve, and that he is thankful that the injury was not worse. The application of heat or cold or of liniments containing camphor, menthol, chloral hydrate, etc., are used during the day. At night

a satisfactory sleep can generally be secured by the use of mild hypnotics. A small number of patients whose suffering is so intense and prolonged that further steps must be taken have shown most gratifying results from the injection of alcohol into the injured nerve on the proximal side of the injury. A few drops of 80 per cent. alcohol in acute cases of causalgia of the median or popliteal nerves will often altogether relieve the pain.

**Mackenzie, Kenneth A. J.** THE REPAIR OF LARGE GAPS IN PERIPHERAL NERVES BY NEUROPLASTY. [Surgery, Gynæcol. and Obstetrics, 1918, XXVII, p. 353.]

From a study of three cases the writer concludes:

- (1) That regeneration and recovery of function is promoted by the use of nerve flaps.
- (2) That both central and peripheral flaps can be used for such purposes.
- (3) That a peripheral flap, by laying down a nerve path, may promote regeneration over a great gap; in one case quoted regeneration occurred over a gap ten and three quarter inches in length.
- (4) That the approximation of nerves and their repair should be done in all cases with the least possible delay. (This would apply as well to cases which are infected as to clean cases.)
- (5) That the arrest of trophic shock can be promoted by early closure of large gaps by flaps.
- (6) That unimpaired nerve tissue should always be utilized for the effective repair of damaged nerves.
- (7) That in their repair, nerves can be successfully sequestered in muscular tissue so as to promote their own regeneration and that of the muscles in which they are embedded.
- (8) That the principle of sequestration can be utilized in proper cases so as to avoid infected zones in wounds and also scars and other obstacles to nerve repair. [Leonard J. Kidd (London, England).]

**Alquier, L.** NERVE DISTURBANCE AND LYMPHATIC ENGAGEMENT. [Rev. Neur., 24, No. 1, Jan., 1917.]

The engorgement of the lymphatics is determined by the presence of small nodules, either soft or hard, and generally tender to pressure. They may be made to disappear. Their presence causes pain of atypical character, a pseudo-neuralgia, or contractures or vasomotor disturbances. [C. D. Camp (Ann Arbor).]

**Langley, N. J.** STRETCHING OF MUSCLES AND NERVES AFTER NERVE SEVERANCE. [British Medical Journal, Feb. 2, 1918.]

The author calls attention to the commonly accepted dictum that all stretching of a paralyzed muscle after severance of its nerve must be

avoided, and brings forth evidence to show that the intermittent stretching of paralyzed muscles to their normal extent does not appreciably promote their atrophy. On the other hand, such mild, intermittent stretching by movements of the joint upon which they act may be beneficial to the muscles, both by keeping the joint mobile, and by preventing contraction of the muscles and aiding in maintaining their nutrition and removing waste products. With reference to the effect of such intermittent stretching on the nerves, the evidence indicates that it is not harmful and is probably decidedly beneficial in the period before nerve suture. After nerve suture, where there has been no shortening of the nerve, slight movements should be begun in a few weeks. These do not jeopardize the nerve's union, they prevent joints stiffening, aid nutrition of the muscles, and tend to elongate the connective tissue which binds the nerve to its neighboring tissues. Where the nerve suture has been accompanied by a reduction in the length of the nerve no movements should be made until there is reason to believe that the union is very firm, and then they should be started very gently and be very limited in extent.

**Burrow, J. Le F., and Carter, H. S.** INVESTIGATION OF ONE THOUSAND CONSECUTIVE CASES OF PERIPHERAL NERVE INJURY. [British Medical Journal, Nov. 16, 1918.]

Great stress is laid upon the need for a full and accurate statement of the methods employed in the study of nerve injuries, and the authors proceed to give their methods in great detail. Their observations after nerve repair point to the following general facts: The first functions to recover are the trophic and vasomotor, trophic ulcers often healing with surprising rapidity. The next to recover is deep sensibility, generally in the order of pressure sense, perception of movement in joints, roughness, and pressure pain. Location of tactile pressure recovers earlier than accurate gauging of position and range of movement. Then there appear radiating, ill localized sensations, usually associated with tingling, and having a high threshold value. The gradual disappearance of these sensations is accompanied by the accurate perception of light touch and a lowering of the threshold value of the stimulus required. Finally the various discriminating senses recover, but usually very imperfectly. Recovery of voluntary movement appears first in the highest muscles and gradually extends downward. It begins long before the radiating and ill localized sensations are gone. The first change in electrical reaction following suture is a brisker response to the anodal closing stimulus. This is followed by a gradual change in the polar reversal through polar equality to normal polarity. Faradic responses are slow in returning and voluntary movement may appear weeks before there is the slightest faradic response.

**Stoffel, A.** THE RESULTS OF NERVE INJURIES AND OPERATION. [München. med. Wchnschr., 1916, 64, Nr. 47.]

Reexamination and revaluation of disabilities consequent upon injuries to the peripheral nerves in 146 patients collected after their discharge by Stoffel found forty-one cases of functional paralysis, forty-four cases whose nerves had received no exploratory surgical treatment, and sixty-one cases which had been treated either by nerve-suture or by freeing the trunk. Of the forty-four cases which had not been explored, sixteen had completely recovered. Of the sixty-one cases which had been operated upon, the operation in thirty-three had been followed by more or less complete recovery (54 per cent.). An analysis of his cases showed that 57 per cent. of the sutured nerves, 69 per cent. of the freed nerves, and 0 per cent. of the nerves treated plastically had recovered at the time of reexamination. The period between operation and recovery of function usually had been between one and two years. Amongst these 146 cases the best results were seen in cases of musculospiral paralysis, the worst in cases either of ulnar or peroneus lesion.

**Watson, F. C.** PARALYSIS OF UPPER EXTREMITY DUE TO COMPRESSION OF BRACHIAL PLEXUS BY SCAR TISSUE. [Surgery, Gynecology and Obstetrics, Dec., 1918.]

Scar tissue compressed three cords of the brachial plexus between the clavicle and the first rib and involved mainly the inner and posterior cords. Under the scar tissue which was carefully removed, the plexus was found intact. To prevent the formation of further scar tissue, Watson sutured about the inner and posterior cords a fascia transplant from the patient's thigh. The arm could be held at a right angle to the body in about five months and sensation was almost normal.

**Barthélemy and Tuffier.** CURE OF ISCHEMIC PARALYSIS OF THE FOREARM BY PERIARTERIAL SYMPATHECTOMY. [Presse médicale, December 19, 1918.]

These authors refer to a case of complete paralysis of the forearm and hand, with disappearance of the radial pulse, following prolonged compression of the shoulder in a landslide. After a month Volkmann's contracture was beginning to occur, and it was decided to practice periarterial sympathectomy. The artery was found to be of the size of the lead in a pencil, white, and apparently empty. Cautious denudation of the vessel for a distance of ten centimeters, followed by irrigation with hot saline solution, resulted in return of the radial pulse and of warmth of the forearm and hand within a few hours. Soon slight movements of the hand reappeared, and in ten weeks after the operation the limb had completely recovered its warmth and motility.

**Rimbaud, L.** RETROMALLEOLAR SAGGING AS A SIGN OF SCIATIC DISEASE.

[Bulletins et mémoires de la Société médicale des hôpitaux de Paris, October 24, 1918.]

Rimbaud emphasizes the importance of study of the region of the tendon Achilles in the diagnosis of disease of the sciatic nerve. In addition to testing the Achilles reflex it is of value to test the sensitiveness of the tendon to pressure and to examine for a lower note upon percussion of the tendon on the affected side as compared with the sound side. The author has also recently been struck by the altered appearance of the Achilles region in some sciatic cases. Instead of appearing as a tense cord down to its insertion into the os calcis, the tendon is less prominent; the two depressions intervening between it and the malleoli are more or less effaced, the tendon seems broadened, and the region as a whole appears edematous. This sign is especially pronounced in wounds of the great sciatic or internal popliteal nerves. It is absent, as a rule, in wounds or paralysis of the external popliteal. It also occurs in medical sciatica, especially when severe and of long standing and seems to be produced particularly where there is sciatic radiculitis or sacral funiculitis through arthritis of the foramina. The sign occurs in about seventy per cent. of all cases of surgical lesion of the sciatic and in twenty-five per cent. of true medical sciaticas. Its cause is probably a hypotonicity of the gastrocnemius and soleus muscles; if these muscles are grasped with the hand and pulled upward the retromalleolar sagging disappears. The sign is best elicited with the patient standing on a chair or table and the heels directed toward the source of light.

**Mancini, C.** RADICAL CURE OF SCIATICA BY LUMBAR ANESTHESIA.

[Riforma Medica, June 1, 1918.]

A method employed by Mancini for many years in the treatment of sciatica consists of injecting twelve to fifteen c.c. of a five per cent. novocaine solution into the third or fourth lumbar interspace. The anesthesia lasts from three quarters of an hour to two hours. The injection may be repeated weekly, although repetition is generally not necessary. Direct contact with the diseased nerve fibers, simplicity and innocuousness, are said to be the advantages of this method.

**Arnone, G.** TRUE AND SIMULATED SCIATICA. [Riv. san Siciliana, 1917,

No. 23, 1918, No. 5.]

The writer illustrates from his minute study the difficulty of distinguishing true from simulated sciatica and that the distinction rests upon a protracted and careful examination and comparison of all the symptoms in detail and of the syndromes in which these appear. He discusses the various symptoms one by one and makes the comparison. In the disturbances of sensibility the pain is of course chiefly in both instances in the sciatic. The simulator, however, complains of a continuous pain

not very clearly limited and without mention of paroxysms. On the other hand the true pain is well located topographically and is of a definite character, continuing with exacerbations, and there are also paresthesia symptoms, tingling sensations of heat or cold. Objective symptoms show also a distinction. Cutaneous sensibility with the true case shows a peripheral topography or a radicular one and besides all manner of sensory disturbances reveal themselves, while the simulator betrays on examination no hyperesthetic zone. In the test of the sensibility of the nerve and its roots, through the tests known as Dejerine's, Néri's, Ehrte's sign, etc., there is always pain evinced, but in simulation this is absent and so also are the classic movements and the reflex modification through pain, pupillary, pulse, arterial pressure, as well as absence of phenomena of ulterior sensation, relative hyperesthesia of Leyden, etc. Spinal anesthesia to novocaine might mislead the simulator.

There will also be a difference in the report of the disturbances of sensibility in muscles, tendons and articular bones. Examination of the muscular and cutaneous reflexes, and of the idiomuscular reflexes would not show in the simulator the characteristic reactions of the true sciatica. Electric excitability would also aid in the distinction. Motor difficulties would be very difficult to simulate consistently with the sensory complaints. It is finally very important to examine for trophic, secretory and vasomotor difficulties. There must also be examination of the cerebrospinal fluid in order to discover the characteristic modifications of the causal disturbance. At the same time psychic symptoms must be looked into to discover whether there is the disturbance produced by pain or the calmness and ability to sleep which the simulator would reveal. [J.]

## 2. CRANIAL NERVES.

**McIndoo, N. E.** THE OLFACTORY ORGANS OF DIPTERA. [Jour. Comp. Neurol., Oct., 1918, 29, No. 5.]

They are similar in structure and position, but different in number from those of hymenoptera, coleoptera and lepidoptera. The decrease in size of the hind wings of diptera, which diminishes their ability to fly is paralleled by a great increase in their olfactory pores to receive appropriate stimuli.

**Eppenstein, A.** TEST OF THE CENTER OF THE SIGHT AREA AND THE BLIND SPOT WITH THE AID OF THE UNIVERSAL PRISM APPARATUS. [Klin. Mbl. f. Aughkl., May, 1918.]

Eppenstein has substituted the use of the Bielschowsky double prism apparatus for the Bjerrum method of discovering the scotoma which in certain cases extends itself from the blind spot. The latter method is an efficient one but a tiring one and errors may creep in with less observant or intelligent patients. The double prism apparatus is binocularly



placed, the picture brought toward the blind spot with the aid of the prism and the latter palpated with the picture. Eppenstein finds that the blind spot may be extended vertically from  $7^{\circ}$  to  $8^{\circ}$  and horizontally from  $5^{\circ}$  to  $6^{\circ}$  without being abnormal, though van der Hoeve considers a lesser degree as possibly pathological. Tube- or chimney-like growths appear at the upper and under ends of the blind spot. This extension of the blind spot, known as van der Hoeve's symptom, may be referred to a retrobulbar neuritis. A semicircular scotoma appearing thus at the border of the blind spot should be watched as it may be the first sign of a glaucoma.

**Magitot.** MODIFICATIONS OF THE PUPIL FOLLOWING CERTAIN OCULAR CONTUSIONS AND THE TRAUMATIC ARGYLL-ROBERTSON SIGN. [Anal. d. Ocul., May, 1918.]

The author treats of certain cases in which he believes the symptoms are due to injury of the choroid ganglion rather than of the ciliary ganglion. In the latter case the mydriasis would be more severe. The injury is in a region less profoundly located and therefore more subject to surface contusion. In fact the contusion in these cases reported produced sometimes a paralysis, sometimes a spasmodic state, sometimes a disturbance of the ganglionic nervous force. There was complete immobility of the pupil with mydriasis, the latter, however, as a rule incomplete. There was also in other cases a combination of myosis, myopia and diminution of tension with or without lactescence of the retina but without retinal hemorrhage. A spasmodic state of the intraocular sympathetic was produced. In still other cases there was dissociation of the pupillary reflexes, either that known as the Argyll-Robertson sign or its inverse, the disappearance of the orbicular pupillary reflex, or again it was the abolition of the sensory reflexes. [J.]

**Cumston, C. G.** THE ETIOLOGY OF CONGENITAL OPHTHALMOPLÉGIA. [N. Y. Med. Jour., May 25, 1918.]

Congenital ophthalmoplegia is an affection which appears to be more prevalent among boys, the proportion being sixty-five per cent. in these and thirty-five per cent. in girls, this high percentage in boys coinciding with the malformations in general, which are much more frequent in this sex. The affection is hereditary and familial in nearly fifty per cent. of the cases. In one case the affection was transmitted by the mother to her three children; in another, by the mother to her daughter, and the latter in turn transmitted it to her son, who also had a son afflicted by congenital ophthalmoplegia. In Gourfein's case the affection passed from the grandfather to the father and to his four sons. In Lawford's case the disease was transmitted by the father to three out of seven of his children, one of the remaining four presenting a congenital ptosis. Generally speaking, the affection is familial, several members of the same family being afflicted. In Gourfein's case, it would even appear

that the disease selected the sex in which it appeared, and it seemed as if the first born of the family were those in which it occurred, quite contrary to what was observed in Lawford's case. In other instances the disease is familial in the sense that cousins or other blood relations have been subjects of the malady. The affection is always congenital. The children are born at term in good health or otherwise, and usually there is no history of difficult labor requiring the use of the forceps. The children do not offer any luetic manifestations, although in Tilley's case the father was considered syphilitic, and in Henck's case there was an increase in size of the epiphyses and various cicatrices, indicating a rachitic condition.

As to other malformations or anomalies occurring at the same time as the ophthalmoplegia, three cases presented closed fontanelles, others a flattening of the lower border of the orbit and malar apophysis; the existence of the epicanthus with partial congenital paralysis of the ocular muscles in the son of a congenital ophthalmoplegic; the presence of a very marked subcutaneous venous circulation in the upper lids and an exaggerated development of the down; protrusion of the eyeball, very marked excavation of the papilla and staphyloma; an abnormal pigmentation of the fundus oculi; malformations of the hands, fingers, and feet, and finally, anesthesia of the trigeminal nerve and facial paralysis. A tardy bodily development has been recorded, and in two cases the infants' eyes remained closed for two weeks following birth.

As to the antecedents of the parents, there is little to be said, and, making abstraction of the familial cases, no antecedents of congenital or acquired ocular affection have even been noted. Syphilis and tuberculosis in the father or mother have once or twice been suspected, but the data pertaining to this point is too vague to be seriously considered. In no case has alcoholism or miscarriage been recorded, but consanguinity is noted in Gunn's case. None of the parents have apparently had a congenital trouble; but mentioned in the collateral antecedents was a paternal aunt of the patient, who had a very marked strabismus.

It is clear that serious foundations for establishing the etiology of congenital ophthalmoplegia are decidedly wanting. Perhaps tuberculosis, syphilis, and all the common factors resulting from infectious diseases or intoxications act by the hereditary channel or directly upon the fetal organism during pregnancy, but this is simply an hypothesis. Neither is it probable that accidents which may disturb fecundation or gestation have any part in the etiology of the affection. However, they should not be completely eliminated, because their influence in teratologic etiology, in its broadest sense, is unquestionable.

**Benjamins, C. E.** TONIC REFLEXES IN THE MUSCLES OF THE EYE.  
[Arch. neerl. de physiol., 1918, 2, 536-544.]

Changes of the position of the eyes of perch and carp were by means of a special apparatus measured during the eye's rotation around the

sagittal, the frontal and the vertical axes. Results were similar to those found in the case of the rabbit. The movement of the eye around the frontal axis in rotation of the body around the transverse axis, and that around the sagittal axis in rotation of the body around the longitudinal axis can both be used to gauge the effect of the partial extirpation of the labyrinth.

**Barrie, T. S.** INEQUALITY OF THE PUPILS. [British Medical Journal, Nov. 9, 1918.]

The question of the meaning of inequality of the pupils is always being raised for diagnostic purposes, especially in affections of the thorax. According to many authorities, "inequality of the pupils is always pathological"; but many observers are not so dogmatic, and admit that the condition occurs in from 1 to 10 per cent. of all cases.

In order to gain some idea of the frequency of this condition Barrie examined the eyes of 326 men who had been sent for special examination. Inequality of the pupils was found in 35 cases, a proportion of 10.73 per cent. In none of these cases was there any sign of ocular disease nor manifestation of disease of the central nervous system. The pupils reacted readily to light, and the consensual and convergence reflexes were normal; in each case the inequality persisted in the contracted state. The inequality in every case was indisputable, the difference between the diameters of the two pupils being from one to two millimeters. This difference is not large, but as pupils are compared by areas it was easier to note differences than to measure them. For example, pupils having diameters of 3 and 2 mm. respectively have areas in the proportion of 9 and 4.

An analysis of these 35 cases gave the following results:

1. The left pupil was the larger in 21 cases, the right in 14.
2. The visual acuity without glasses was the same in 10 cases; the right eye had the higher visual acuity in 8 cases, the right pupil being the larger in 4; the left eye had the higher visual acuity in 17 cases, the left pupil being the larger in 13.
3. The refractive condition of the 35 cases was as follows:

Emmetropia .....	2
Hypermetropia .....	2
Hypermetropic astigmatism .....	2
Myopia .....	11
Compound myopic astigmatism .....	1
Mixed astigmatism .....	3
Anisometropia .....	9
Not recorded .....	5

The conclusions which may be drawn from this investigation are as follows:

1. Inequality of the pupils is frequent.
2. It is associated with all refractive conditions, with a tendency to be more frequent in myopic conditions.

3. The visual acuity is not affected adversely by the fact that one pupil is slightly larger than the other.
4. The left pupil is more frequently larger than the right.
5. Inequality of the pupils occurs as a physiological condition.

### 3. SPINAL CORD.

**Amoss, H. L., and Haselbauer, Peter.** THE RAT AND POLIOMYELITIS. [Journal of Experimental Medicine, October, 1918.]

In order to test Richardson's theory that the rat and its parasite, the flea, are active agents in the transmission of poliomyelitis, the authors tried to transmit this disease to monkeys by inoculating the central nervous and visceral organs of rats caught in Brooklyn, where the epidemic prevailed in the summer of 1916. Such material was injected into monkeys under conditions sufficient to incite infection, if the poliomyelitic virus had been present in the internal organs of the rat in any considerable amount, and of any real virulence. The monkeys failed to respond to two large inoculations, made two weeks apart, so it appears that none of the rats tested carried demonstrable amounts of poliomyelitis. Experiments to show the power of survival of an active virus of poliomyelitis, when injected into the brain of rats, proved that it does not survive there as long as four days in a form or in amounts sufficient to cause infection when inoculated intracerebrally into monkeys. This was not due to the quantity introduced, as at the end of one and a half hours after the injection, the excised inoculation site when injected into the monkey caused typical experimental poliomyelitis. It does not seem probable that the rat acts as a natural reservoir of the virus of poliomyelitis.

**Figueira, F.** FIGUEIRA'S SYNDROME. [Brazil-Medico, July 6, 1918.]

At a recent session of the Medical Society of the Bahia Hospitals it was proposed to give the name of a new syndrome to its discoverer, who is a well known Brazilian pediatricist. This syndrome is believed to be an attenuated, sporadic type of acute poliomyelitis. The affection is evidently of rare occurrence, which makes it difficult to study, and moreover is benign, so that its clinical significance is not great. There appears to be only a temporary hyperemia in place of organic lesion of the nerve centers. A case cited in a child of 20 months presented as chief symptoms weakness of the neck musculature, so that the head could not be held erect. There was also slight spasticity of the muscles of the lower extremities and exaggeration of the tendon reflexes. There was a lively Babinski reflex. The infant had been born at term, but there were evidences of retarded cerebral development, and the case was judged not to be one of Figueira's syndrome. In another case regarded as a true example of the latter the diagnosis might well have been post-diphtheritic paralysis because the patient had recently suffered an attack

of diphtheritic angina. But the only muscles to suffer were those of the neck, paralysis being absolute and of the flaccid type. There were no other symptoms of any kind, and the paralysis had disappeared completely in 15 days. This affection does not agree with any known case of diphtheritic paralysis and is typical of the syndrome already placed on record by Figueira. In the discussion which followed the reading of the paper one member expressed the opinion that the case narrated was one of diphtheritic paralysis, but if it was it was certainly unusual, for the symptoms presented differed greatly from those of a typical case of this condition. [Med. Rec.]

**Crookshank, F. Graham.** INFLUENZA AND THE STORY OF A "NEW DISEASE." [London Lancet, 1918, I, 699.]

F. Graham Crookshank, physician to the N. W. London Hospital, delivered the first Chadwick lecture in the rooms of the Medical Society of London, on Thursday, October 10, 1918.

Dr. Crookshank referred at the outset to the great work done by Chadwick and his associates; and pointed out, by some citations from Chadwick's writings, the breadth of view taken by that great man who, while fully alive, as he himself said, not only to the obscure "climatorial" and geographical influences determining the recurrence at long intervals of certain epidemic diseases, yet held strongly that, in the vigor of men's lives, as secured and promoted by their surroundings and circumstances, is to be found their best security against the invasion of their bodies by the organismal causes of zymotic disease. He suggested, without undervaluing the results of modern bacteriological investigations, that greater flexibility of mind in the investigation of epidemic disease may lead to greater achievements in the future, if the broader views of Chadwick, and those who, like Collins, have upheld them, are accorded fuller consideration than has lately been the case.

Passing to the immediate subject of his lectures, Dr. Crookshank pointed out that the affection known pretty generally on the Continent as the Heine-Medin disease (though in this country by the older names of infantile paralysis, or acute poliomyelitis), is usually said to have had a history of but a hundred and forty years. Nevertheless, there is reason to believe that in various guises it has been with us for centuries. A sketch of the disease as it has been regarded since the labors of Wickman in Sweden was given, and reference was made to the epidemic of 1916 in America, following "pseudo-influenza" in 1916, of 1917 in Australia (where it was called the "Mysterious Disease") and to the late epidemic in Great Britain, which was at first so erroneously confused with botulism, but is now, by various eminent authorities (if not by all) regarded as having represented a mood, less familiar than others, of the Heine-Medin disease. An outline was then given of the history of the growth of the present conception of the disease, from the allu-

sions of Underwood in 1784 to a form of "debility of the extremities," to the later writings of Heine in 1840, the investigations of Medin in 1850, and the later work of Wickman, who so extended our idea that we now have regard to an acute catarrhal infection, followed in many cases, but not in all, by nervous manifestations of a most varied character.

Incidentally it was mentioned that Sir Walter Scott's account of the origin of his own lameness in 1773 is not only the earliest, but one of the most precise of the early accounts of a case of "infantile paralysis." The lecturer then turned to a consideration of some Early English and Continental epidemics, showing how during the fourteenth, fifteenth, and sixteenth centuries many severe catarrhal, "sweating," or influenza-like epidemics were associated with the prevalence of cases of illness affecting the brain and spinal cord in the manner observed during the epidemics of Heine-Medin disease of late years; and he pointed out, moreover, how frequently these epidemics were regarded as "new diseases," and popularly connected with the consumption of certain articles of food, or with food deterioration. So lately as 1842, when in Italy there were outbreaks of illness associated with strongly marked nervous symptoms, Agostinacchio recognized the affinity of these outbreaks with the "sweating sickness" of 1529, while others regarded the disease as influenza, as inflammation of the brain, and as possibly a food disease. Some account was also given of various other epidemics and outbreaks, in the seventeenth century, resembling the late occurrences in Great Britain, France, Austria and Australia.

The second lecture was delivered on Thursday, October 17.

Dr. Crookshank gave on this occasion an account of the "Epidemical Feavour, chiefly Infestous to the Brain and Nervous Stock," described by Thos. Willis in 1661—a disease which has been the subject of discussion for many years, but which there is good reason to believe represents one form or mood of epidemic encephalomyelitis (which lately reappeared in this country as in other times and places, concurrently or coincidentally with influenza and has been otherwise known as Heine-Medin disease, acute poliomyelitis, and, in part, as "infantile paralysis"). The history of various epidemics and prevalences described in Britain during the seventeenth and eighteenth centuries by Sydenham, Gilchrist, Butter and others was related, and an account was given of contemporaneous and similar occurrences in France and Germany. The relation of some forms of disease once described as "Spinal Typhoid," etc., to the Heine-Medin disease was discussed. Reference was made in some detail with special reference to the work of Wernicke and Oppenheim to the chequered history during the nineteenth century of "encephalitis"; a form of disease much discussed, often disputed and frequently "discovered." The lecturer remarked that, just as M. Jourdain had spoken prose all his life without knowing it, so had the medical profession for many years witnessed these epidemics, and constantly hailed them as



evidencing a "new disease." The ever-varying character of the symptoms and types that had led to so much discussion were possibly due to differences in the virulence of the poison, but certainly were connected with variations in the well-being and dietetic and sanitary conditions of the populations affected—with, in fact, the "soil" on which the seed was sown. Some of the severest outbreaks recorded were associated with peculiar local or "endemic" conditions, and evidence was brought forward of persistence of "type" in particular localities and districts.

The third and concluding lecture was given on Thursday, October 24.

The lecturer dealt with the history of two diseases, usually ascribed to forms of food poisoning, which present or presented, in many respects, points of epidemiological and clinical resemblance to Heine-Medin disease, as now conceived: namely Raphania and Botulism. Raphania was the name given in the eighteenth century, by Linnæus and his pupils, to an epidemic disorder characterized by mental affections, paralyses, and convulsions, that spread through Sweden in certain years of general prevalence of influenza, and that, by Linnæus, was ascribed to the admixture of radish seeds with breadstuffs, though by later German writers confused with the *chronic* affections due to "ergotism." Raphania was thought to have reappeared in Italy in the middle of the nineteenth century, when influenza, cerebro-spinal meningitis and encephalitis then broke out in severe forms and were identified by Agostinacchio with the "Sweating Sickness." Botulism, the lecturer pointed out, was originally the name given during the influenza periods of the nineteenth century to a form of disease, clinically identical with some types of polioencephalitis, that had attracted attention in Wurtemberg so early as 1820, when Justin Kerner wrote a treatise tracing it to the consumption of blood-sausages and allied comestibles. Cases had already been noted in 1755. The lecturer, after dealing with the *later* history of "botulism," suggested that, in respect of this affection and also in respect of "raphania," it was probable that deficiencies in dietary had in the past intensified or aggravated the effects of the virus of what we now call "Heine-Medin" disease, and the influenza-like affections with which it is associated, and had thus played an important part in the production of the epidemics and outbreaks to which these names of "Raphania" and botulism had been given. It was necessary, the lecturer insisted, to avoid ascribing primary importance to factors which are really secondary (in a logical sense) in the production of diseases and equally important to remember that the effects and consequences of a virus such as that of influenza and allied affections are varied and determined (to an extent only appreciated perhaps by epidemiologists) by the many conditions and circumstances—the "soil" in fact, on which it may fall, as well as by the "Epidemic Constitution" of the year.

Recent research had, only during the last few months, rudely shaken many of the claims put forward by the more orthodox of the laboratory

students of disease; and, for a full understanding of epidemic disease it was necessary to return in some measure to the teachings of the older school, who, like Sir Edwin Chadwick, refused to lose sight of the importance of "soil" conditions and to allow the microbic element to attain an overwhelming mastery in our conceptions of the disease.

In conclusion the lecturer restated the main points to which he had addressed himself; insisting that, while the Heine-Medin conception of to-day was, in a sense "new"; yet the malady had been with us for centuries and that almost the most striking fact in relation to it was its epidemiological association with the malady or maladies we call influenza, pointed out by Borstioni<sup>1</sup> in 1905.

The elucidation of this association would probably be a task of some difficulty, and, if the conceptions of Heine, Medin, Wickman, Draper and others came to be merged in something yet more far-reaching, we should still remember how, in 1661, Thomas Willis of Oxford, described for us and gave us, the idea of "An Epidemical Feavour, chiefly Infestous to the Brain and Nervous Stock." [Author's Abstract.]

**Stevens, H. C.** WASTING OF MUSCLES AFTER PARALYSIS. [Journal A. M. A., March 23, 1918.]

Stevens questions the trophic influence of the nervous system as the cause of muscular atrophy, and credits it to an incessant fibrillar action of the muscles thus cut off from the nerve centers. This peculiar fibrillation was first observed by Schiff in 1851, though its significance was not then appreciated by him. It begins from three to six days after the nerve section, and persists until the regeneration of the nerves. Stevens reports his own experiments on dogs, using sections of the facial, the hypoglossus and the tibial nerves. Of these the hypoglossus is the most satisfactory for observation. The essential phenomenon is a fine tremorlike movement near the tip of the tongue on the operated side, appearing first about the third or fourth day. At the end of seven days marked rhythmic motions appear, and as time passes the tremor runs toward the root of the tongue, and a wormlike movement is seen or felt on the dorsum of the tongue near the midline. Repeated for from ten to twenty times per second. The disappearance of the movement is also gradual. The tropic or nutritive function of the nerve is rejected by Stevens, and the continuity theory of nerve and muscle tissues is also discarded. He holds that the atrophy is due to the fatigue caused by the fibrillar contractions, since it is a well-known fact of the action of muscle and will lead to its shrinkage.

<sup>1</sup> Lancet, 1918 (i), 699.

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